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Results of Spiny Dogfish (*Squalus acanthias*) Tagging in B. C. Waters during 1984 and 1985

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Canadian Data Report of Fisheries and Aquatic Sciences

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RESULTS OF SPINY DOGFISH (*Squalus acanthias*) TAGGING IN B.C. WATERS DURING 1984 AND 1985

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ABSTRACT

Smith, M. S., M. W. Saunders, G. A. McFarlane, and L. G. (Van) Egan. 1989. Results of spiny dogfish (Squalus acanthias) tagging in B.C. waters during 1984 and 1985. Can. Data Rep. Fish. Aquat. Sci. 778: 213 p.

During 1984 and 1985, 20,430 spiny dogfish were tagged in British Columbia waters, 11,409 in the Strait of Georgia and 9,021 off southwest Vancouver Island. All of these fish were tagged with a modified Petersen disc tag. A total of 59,196 spiny dogfish have been tagged in British Columbia waters since 1978. As of December 31, 1985, 1,727 have been recovered. Preliminary information on recoveries (593) from 1984 and 1985, all released in the Strait of Georgia, indicates that 85% (505) were recaptured in the Strait, 1% (6) moved north of the Strait of Georgia, 3% (20) moved south into Puget Sound and Juan de Fuca Strait and 3% (16) into outer coastal areas of Washington and Vancouver Island. In addition, 88 fish were recovered during 1984 and 1985 from all offshore releases. These recoveries were made from California to Japan.

Key words: spiny dogfish, tagging, migration, tag performance

RÉSUMÉ

Smith, M. S., M. W. Saunders, G. A. McFarlane, and L. G. (Van) Egan. 1989. Results of spiny dogfish (Squalus acanthias) tagging in B.C. waters during 1984 and 1985. Can. Data Rep. Fish. Aquat. Sci. 778: 213 p.

En 1984 et 1985, 20 430 aiguillats communs ont été étiquetés dans les eaux de la Colombie-Britannique, soit 11 409 dans le détroit de Géorgie et 9 021 au sud-ouest de l'île de Vancouver. Tous ces poissons ont été munis d'un disque Petersen modifié. Depuis 1978, 59 196 aiguillats communs ont été étiquetés dans les eaux de la Colombie-Britannique. Au 31 décembre 1985, 1 727 poissons étiquetés avaient été pris. Les renseignements préliminaires sur les poissons étiquetés du détroit de Géorgie qui ont été repris en 1984 et en 1985 (593), révèlent que 85 pour cent des poissons ont été repris dans le détroit de Géorgie, qu'un pour cent de ceux-ci (6) a émigré au nord du détroit de Géorgie, que 3 pour cent (20) ont émigré dans Puget Sound et le détroit Juan de Fuca, et que 3 pour cent (16) ont émigré dans les eaux côtières extérieures de l'État de Washington et de l'île de Vancouver. En outre, de tous les poissons relâchés au large, 88 ont été repris en 1984 et en 1985, les prises étant réparties de la Californie au Japon.

Mots-clés: Aiguillat commun, étiquetage, migrations, récupération d'étiquettes

INTRODUCTION

This is the sixth report describing the results of the spiny dogfish (Squalus acanthias) tagging program. This report is similar in format to previous reports (Brown et al. 1979; Beamish et al. 1981; McFarlane et al. 1982; Smith et al. 1983; Saunders et al. 1985), and presents release information for taggings conducted during 1984 and 1985 and recovery information to December 31, 1985. Individual fish recovery information is not included.

The primary purpose of the program is to examine the growth and movement of dogfish throughout British Columbia waters. This report also describes the performance of the modified Petersen disc tag and OTC injections.

MATERIALS AND METHODS

A total of six dogfish tagging cruises were conducted through 1984 and 1985. Dogfish were tagged in the Campbell River area in May 1984 and May-June 1985 by students and staff of the Campbell River School district on board the chartered fishing vessel "INVADER NO. 1". Pacific Biological Station staff conducted other operations during March 1984, in south and central sections of the Strait of Georgia aboard the chartered vessel "VELMA C", and aboard the research vessel "G.B. REED" off the southwest coast of Vancouver Island during May 1984, Feb.-March 1985 and July 1985.

Longline gear was used during all cruises in the Strait of Georgia, set up similarly on both vessels. The longline gear consisted of Mustad #2 halibut hooks with barbs bent over (#6283 quality 9401) fastened to a braided nylon gangion 55 cm long and attached to the groundline with snaps 2-3 m apart. All hooks were baited with frozen herring. During the Campbell River cruises each set consisted of 85 to 310 hooks while 498 to 1106 hooks per set were used on the March 1984 cruise (Tables 2, 3 and 4). Soak time, defined as the time between the first hook overboard and the first hook coming on board, varied between 40 and 80 min in the Campbell River cruises and 55 and 225 min during the March 1984 cruise. Fishing depths ranged between 150 and 320 m in March 1984, 24 to 157 m in May-June 1984 and 18 to 154 m in May 1985.

A Modified Eastern trawl with a bobbin groundline was used for the three cruises off southwest Vancouver Island. Trawl

hauls ranged from 15 to 60 min in length and 47 to 300 m in depth.

After capture all fish were placed in live tanks with continuously flowing sea water. Fish were removed from the live tanks and anesthetized in a smaller tank containing 150 l of seawater and 25 mg of tricaine methane sulfonate (MS 222). When the fish appeared lethargic they were removed from the anesthetic, measured, sexed, tagged, injected with OTC if required, and released. On board the G.B. REED, fish were held up to one hour after tagging in live tanks prior to release. Records were kept of area of capture and release as well as general condition of the fish, small injuries etc., and problems with the tag.

All fish were tagged with the modified Peterson disc (Beamish et al. 1981; McFarlane and Beamish 1986) using the procedure described previously (Brown et al. 1979; Beamish et al. 1981; McFarlane et al. 1982; Smith et al. 1983; and Saunders et al. 1985).

All fish were measured for total length, described as the distance measured between the tip of the snout and tip of the upper lobe of the caudal fin when it is directed downward in a straight line with the body.

Validation studies of the current ageing method were continued. OTC purchased under the brand name of Liquamycin, is oxytetracycline hydrochloride dissolved in a stabilizing agent and supplied in 250 ml bottles at a concentration of 100 ml/L. It was injected with a 5 cc disposable syringe with 20 gauge, 3.8 cm needles at a rate of 25 mg/kg of body weight. The tagging/measuring board was marked with injection rates based on a length/weight conversion (Saunders et al. 1984).

A reward ($2.00) was paid for the return of the tags only, and because the second dorsal spine is required for age determination studies a higher reward ($5.00) was paid for the return of a whole tagged dogfish.

RESULTS AND DISCUSSION

TAGGINGS

A total of 20,430 dogfish were tagged and released during 1984 and 1985 (Table 1). Set location and catch data are

presented in Table 2 for March 1984, and in Tables 3 and 4 for the Campbell River area taggings, 1984 and 1985 respectively. Set locations and capture data for the three G.B. REED cruises are included in Appendix tables 1 to 3. Release data by set including numbers of males and females released, number injected, release location and tag series numbers are presented for all cruises in Tables 5 through 10. Incidental species caught during March 1984 and Campbell River 1984 and 1985 cruises are listed in Tables 11, 12, and 13.

Lists of common and scientific names of fishes encountered during these tagging cruises are included in Table 14. A reference map of release and recovery place names is presented in Figure 1.

Length frequencies of fish released by set and sex for each cruise are presented in Appendix tables 4 to 9. Included in each table is total caught and total untagged. Histograms of length frequencies by sex are presented for each cruise on Figures 2 to 7. These histograms indicate that the length frequency of released fish is representative of those caught for all cruises.

During the March 1984 cruise fishing effort was directed to the south and central areas of the Strait of Georgia. A total of 3277 fish were tagged, including 1056 in the Active Pass area, 697 in the Halibut Bank area of the south Strait section, 993 in the Malaspina Strait and 531 near Grant Reefs area of the central section of the Strait of Georgia. Slightly more females (53%) were tagged. Females ranged from 45 cm to 120 cm with a mode at 100 cm while males ranged from 47 cm to 99 cm with a mode at 80 cm (Appendix table 4; Fig. 2).

In May-June of 1984, 4019 fish were tagged in the Campbell River area, this included 3745 in the Cape Mudge area; 189 in the Oyster Bay area, 52 south of Marina Island and 32 in Deepwater Bay. Males predominated (75%) ranging from 46 cm to 100 cm with a mode at 81 cm. Females ranged in size from 42 cm to 120 cm, with modes at 105 cm, 100 cm, and 70 cm, respectively (Appendix table 5; Fig. 3). In addition, 1952 (49%) of the tagged fish received an intermuscular injection of OTC.

In May of 1985, 4113 fish were tagged in the Campbell River area; most were tagged in the Cape Mudge area where 3326 were released, a further 600 were released in the Marina Island area and 187 in the Oyster Bay area. Once again males predominated (71%) and ranged in size from 46 cm to 100 cm, with a mode at 82 cm. Females ranged from 45 cm to 122 cm with modes at 100, 105 and 62 cm (Appendix table 6; Fig. 4). A total of 2,027 (49%) of the tagged fish received an intermuscular injection of OTC.

Three tagging cruises were conducted off southwest Vancouver Island on board the research vessel G.B. REED, May 1984, February-March 1985, and July 1985.

During May 1984, a total of 1978 fish were tagged. The majority were tagged off Cape Beale. Males predominated (60%) (1185 fish) and ranged in size from 54 to 99 cm with a modal size at 84 and 86 cm. Females (793 tagged) ranged in size from 58 cm to 117 cm and with modes at 101, 72, 80, 85, and 107 (Appendix Table 7; Fig. 5).

In February-March 1985, 1057 fish were tagged. Females predominated - 93% (981 fish) and ranged in size from 523 to 121 cm with a modal size at 102 and 106 cm. Only 76 males (7%) were tagged (Appendix Table 8; Fig. 6).

During July of 1985, 5986 fish were tagged in same areas as the previous two cruises. Slightly more males were tagged (51%) (3023 fish). Males ranged in size from 44 to 109 cm with a modal size at 70, 73, 81, 83, and 85. Females (2956 fish) ranged in size from 40 to 120 cm with a modal size at 68 cm (Appendix Table 9; Fig 7).

RECAPTURES 1978-1985

A total of 59,196 spiny dogfish have been tagged and released since 1978 (Table 1) of which 44,434 were released in Georgia Strait, 5741 in Dixon Entrance, Hecate Strait and Queen Charlotte Sound and 9021 off southwestern Vancouver Island. As of December 31, 1985, 1606 (3.8%) of Georgia Strait, 74 (1.3%) of north coast and 47 (0.5%) of the southwest Vancouver Island releases have been captured.

RECAPTURES 1984-1985

A total of 154 (2.3%) fish were recovered prior to December 31, 1985 from the three taggings conducted in the Strait of Georgia.

The majority of the fish were recovered in the southern (59) northern (33) and central (20) Strait of Georgia areas. Others were recovered from Puget Sound (4), southwest Vancouver Island (5), offshore Washington State (1), Johnstone Strait (2) and Juan de Fuca Strait (1) (Fig. 8 and 9). A further 16 were recovered in the Strait of Georgia with no details, 2 were

identified as Canadian recoveries only, and thirteen had no accompanying area information.

Trawls recaptured most (49) of the dogfish followed by sport (salmon) (31), longline (22), salmon gillnet (15), sunken gillnet (6), salmon seine, and a further 30 with no recapture method information.

Ninety-nine whole fish were returned and only 17 of all recaptures were less than 70 cm at time of release.

A total of 9021 tagged dogfish were released off the southwest coast of Vancouver Island during 1984 and 1985 (Table 1) of which 47 were recovered by December 31, 1985. Eighteen were recovered off the southwest coast of Vancouver Island, 6 off Washington, 4 off Oregon, 1 off California, 2 from Strait of Juan de Fuca, 1 from Puget Sound, 3 from southern Georgia Strait, 1 from Hecate Strait, 2 unknown Georgia Strait and 10 with no information (Fig. 10).[1]

RECAPTURES FROM TAGGING IN 1983

A total of 1613 tagged dogfish were released in the Campbell River area in 1983. As of December 31, 1985, 36 (2.2%) have been recovered of which 12 (0.7%) were recovered during 1983, 16 (1.0%) during 1984 and 8 (0.5%) during 1985.

The majority of the 24 recoveries during 1984 and 1985 were from the Strait of Georgia, 8 from the northern section, 4 from the southern section, and 1 from the central section (Fig. 11) and an additional 6 were identified from Georgia Strait only. Five recoveries had no location of recapture information.

The recapture method was known for 17 of the 24 recaptured dogfish of which 12 were caught by longline, 3 by trawl, 1 by sports gear and 1 by salmon gillnet.

Nine whole fish were returned and only one of the recaptured fish (24) was less than 70 cm when released.

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[1]Numbers indicated on figures may not agree with those in text as locations of some recoveries are incomplete and are not included in figures.

RECAPTURES FROM TAGGING IN 1982 - STRAIT OF GEORGIA

A total of 10,502 tagged dogfish were released in the Strait of Georgia during 1982, 3536 in the northern section, and 6966 in the central section. Recoveries as of December 31, 1985 total 398 (3.8%) of which 91 (0.9%) were recovered in 1982, 121 (12.%) in 1983, 116 (1.1%) in 1984 and 67 (0.6) in 1985. Of the 183 dogfish recovered in 1984-85 from 1982 releases in Georgia Strait, 45 were from the northern Strait of Georgia area, 41 from the southern Strait of Georgia area, 37 from the central Strait of Georgia area, 34 from unknown Georgia Strait locations, 1 from Puget Sound, 2 from offshore Washington State, 1 from the southwest coast of Vancouver Island, and one from Queen Charlotte Sound (Fig. 12). Six recoveries were incomplete but were from Canadian waters. Fifteen recoveries had no information.

Recovery method information was obtained from 153 of the 183 recovered fish with 64 taken by longliners, 38 by trawl, 33 by sportsfishing, 15 by salmon gillnet, 2 by sunken gillnet and 1 by salmon seine.

One hundred and twenty-five whole fish were recovered and none of the recaptured fish (183) was less than 70 cm when released.

RECAPTURES FROM TAGGING IN 1982 - NORTH COAST

A total of 4677 dogfish were tagged during two cruises in Dixon Entrance-Hecate Strait in 1982 (Table 1). Fifty three (1.1%) have been recovered to date of which 8 (0.2%) were recovered during 1982, 9 (0.2%) during 1983, 19 (0.4%) during 1984 and 17 (0.4%) during 1985. The majority of the 36 recoveries from 1984 and 1985 were from Hecate Strait and the southwest coast of Vancouver Island, 19 and 5, respectively. In addition, there was one recovery from Queen Charlotte Sound, 2 from Johnstone Strait, 1 from northern Strait of Georgia, 1 from southern Strait of Georgia, 2 from the Hokkaido area of Japan (Fig. 10) and 5 with no recovery information.

Recovery gear information was obtained from 30 of the 36; with 13 caught by trawl, 12 by longline, 2 by sports gear and 2 by sunken nets.

Twenty-eight whole fish were returned for sampling. All recovered fish were greater than 70 cm at time of release.

RECAPTURES FROM TAGGING IN 1981

During 1981 a total of 6968 tagged dogfish were released in the Strait of Georgia, 3394 in the Campbell River area, and 3574 from the south and central Strait of Georgia areas (Table 1). Recoveries as of December 31, 1985 total 321 (4.6%) of which 24 (0.3%) were recovered during 1981, 106 (1.5%) during 1982, 95 (1.4%) during 1983, 66 (1.0%) during 1984, 30 (0.4%) during 1985.

The majority of the 96 recoveries were from southern Strait of Georgia where 47 were recovered. The northern section produced 13, the central section produced 10 and 12 fish were produced from unknown Strait of Georgia locations. Other recoveries from 1981 releases include Johnstone Strait - 1, Strait of Juan de Fuca - 1, and offshore Washington - 4 (Fig. 13). There were 2 recoveries from unknown Canadian waters and 6 with no recovery locations.

Eighty-two of the recaptures had recovery gear information. Trawls captured 31 fish - longlines 22, sports gear 14, salmon gillnets 12, sunken gillnets 2, and salmon seines 1.

Fifty-nine whole fish were recovered. Eighty-nine of the 96 recaptured fish were greater than 70 cm when released.

RECAPTURES FROM TAGGING IN 1980 - STRAIT OF GEORGIA

During 1980, a total of 7482 dogfish were tagged in the southern and northern Strait of Georgia areas (Table 1). A total of 375 (5.0%) fish from these releases have been recaptured to date of which 67 (0.9%) were recovered in 1980, 68 (0.9%) in 1981, 78 (1.0%) in 1982, 71 (0.9%) in 1983, 64 (0.9%) in 1984 and 27 (0.4%) in 1985. Of the 91 recovered in 1984-85, 51 were recovered in south Strait of Georgia, 9 in the north Strait of Georgia, and 6 from the central Strait of Georgia area (Fig. 14). An additional 15 were identified as recoveries from Georgia Strait only with no specific location. There were 3 Strait of Juan de Fuca, and 2 from Puget Sound, 1 unknown Canadian and 4 with no recovery data.

Recovery gear information was obtained for 87 of the 91 recaptures with 43 caught by trawl, 21 by longline, 13 by sports gear, 9 by salmon gillnet, and 1 by sunken gillnet.

Sixty-two whole fish were recovered. Six of the recoveries were less than 70 cm at time of release.

RECAPTURES FROM TAGGING IN 1980 - NORTH COAST

During 1980, 1064 dogfish were tagged and released in the Queen Charlotte Sound, Hecate Strait, Dixon Entrance areas (Table 1). A total of 21 (2.0%) were recovered by December 31, 1985. By year, 1 was recorded in 1980 (0.1%), 4 (0.4%) in 1981, 8 (0.8%) in 1982, 3 (0.3%) in 1983, 3 (0.3%) in 1984, and 2 (0.2%) in 1985. The 1985 recaptures were both reported from Hecate Strait (Fig. 10) one caught by longline and other by trawl. The 3 recaptures from 1984 had no recovery locations nor gear method.

Whole fish were recovered each time, all recaptured fish were greater than 70 cm at time of release.

RECAPTURES FROM TAGGING IN 1979

A total of 4542 dogfish were tagged during two cruises during 1979 in the Strait of Georgia (Table 1). A total of 270 (5.9%) fish have been recovered of which 34 (0.7%) were recovered in 1979, 75 (1.7%) in 1980, 43 (0.9%) in 1981, 34 (0.7%) in 1982, 43 (0.9%) in 1983, 30 (0.7%) in 1984, 11 (0.2%) in 1985.

The majority of 41 fish of the 1984-1985 recoveries were from the north, south, and central areas of the Strait of Georgia where 15, 8, and 4 fish were recovered respectively (Fig. 15). An additional 4 fish were recovered from Georgia Strait with no recovery data. There was one Hecate Strait recovery, 2 from the southwest coast of Vancouver Island, 1 from offshore Washington, 1 from Johnstone Strait, 1 from Puget Sound and 4 from unknown locations.

Recapture method was reported for 37 fish of which 11 were caught by longlines, 11 by sports gear, 10 by trawls, and 5 by sunken gillnets.

A total of 26 whole fish were returned, all recaptures were greater than 70 cm when released.

RECAPTURES FROM TAGGING IN 1978

A total of 1918 dogfish were tagged in the Campbell River area in 1978 (Table 1). Fifty-five (2.9%) have been recovered to date, of which 15 (0.8%) were recovered in 1978, 16

in 1979 (0.8%), 6 (0.3%) in 1980, 4 (0.2%) in 1981, 4 (0.2%) in 1982, 4 (0.2%) in 1983 and 1 in 1985.

The single recovery for this period was recovered from the central Strait of Georgia area.

Oxytetracycline (OTC) studies

As of December 31, 1985, a total of 17,804 dogfish have been injected with OTC (Table 1). Evaluation of OTC of spines from injected fish continues as recoveries are received (McFarlane and Beamish 1987).

Tag performance

Wounds caused by tags continue to be monitored when whole fish are returned. Samples of the titanium pins from 3 different releases have been sent to a metallurgical laboratory for examination. No corrosion was found on any of the samples (McFarlane and Beamish 1986).

ACKNOWLEDGMENTS

This study continues to provide specific information that assists in management strategies for spiny dogfish. It also allows high school students to participate in the execution and analysis of a practical biological research project. In part, the success of this study is a direct result of the participation and enthusiasm of students of Campbell River Senior Secondary and Southgate Secondary School. A special thanks to Van Egan for co-ordinating teachers and student teams from the two schools. Thanks are also extended to Captain Hugh Watson of the M/V INVADER #1 and Capt. Frank Ross and crew of the M/V VELMA C.

REFERENCES

Beamish, R. J., M. S. Smith, L. G. (Van) Egan, D. Brown, and G. A. McFarlane. 1981. Results of spiny dogfish (Squalus acanthias) tagging in the Strait of Georgia in 1979. Can. Data Rep. Fish. Aquat. Sci. 262: 73 p.

Brown, D. R., L. G. (Van) Egan, M. S. Smith, and R. J. Beamish. 1979. Results of spiny dogfish (Squalus acanthias) tagging in the Strait of Georgia in 1978. Fish. Mar. Serv. Data Rep. 141: 32 p.

McFarlane, G. A. and R. J. Beamish. 1986. A tag suitable for assessing longterm movements of spiny dogfish (Squalus acanthias) and preliminary results of this tag. N. Am. J. Fish. Manage. 6 (1). pp. 69-76.

McFarlane, G. A. and R. J. Beamish. 1987. Validation of the dorsal spine method of age determination for spiny dogfish. In: Age and Growth of Fish. 1987. Iowa State University Press, Ames: pp. 287-300.

McFarlane, G. A., R. J. Beamish, M. S. Smith, L. G. (Van) Egan, and D. Brown. 1982. Results of spiny dogfish tagging in the Strait of Georgia, Queen Charlotte Sound, Hecate Strait and Dixon Entrance during 1980. Can. MS Rep. Fish. Aquat. Sci. 1646: 123 p.

Saunders, M. W., G. A. McFarlane, and M. S. Smith. 1984. Abundance, distribution, and biology of spiny dogfish (Squalus acanthias) in Hecate Strait during Sept. 7-Oct. 1, 1982. Can. MS Rep. Fish. Aquat. Sci. 1754: 161 p.

Saunders, M. W., G. A. McFarlane, and M. S. Smith. 1985. Results of spiny dogfish (Squalus acanthias) tagging in British Columbia waters during 1982 and 1983. Can. Data Rep. Fish. Aquat. Sci. 515: 228 p.

Smith, M. S., G. A. McFarlane, and L. G. (Van) Egan. 1983. Results of spiny dogfish (Squalus acanthias) tagging in the Strait of Georgia during 1981. Can. Data Rep. Fish. Aquat. Sci. 424: 95 p.

Table 1. Summary of dogfish tag releases and OTC injection 1978 to 1985.

Cruise	Numbers tagged M	F	T	OTC injections Inter-muscular	Intra-peritoneal	Control	Series numbers	Area
							Peterson discs	
April-June 1978	624	1,294	1,918		no injection		DF41000-42599 DF42800-42899	Northern Strait of Georgia
April-May 1979	1,668	1,543	3,214		no injection		DF42600-42799 DF42900-46299	Northern Strait of Georgia
							Modified Peterson discs	
November 1979	547	781	1,328		no injection		DF59000-60338	Southern and central Strait of Georgia
February 1980	1,244	307	1,551		no injection		DF60367-61928	Southern Strait of Georgia
March 1980	2,399	809	3,210				DF61929-65156	Southern Strait of Georgia
April-May 1980	1,752	969	2,721	1,460	-	1,261	DF65200-65999 DF137000-138942	Northern Strait of Georgia
							Peterson discs	
June-July 1980	272	791	1,064		no injection		DF46300-46810	Dixon Entrance, Hecate Strait,
							Modified Peterson discs DF138892-139499	and Queen Charlotte Island
April-May 1981	2,733	661	3,394		no injection		DF157000-160482 DF160500-160530	Northern Strait of Georgia
November 1981	1,212	2,359	3,574	2,718	854	2	DF160484-160499 DF160531-161999	Southern and central Strait of Georgia
March 1982	2,281	711	3,001	1,492	758	751	DF8244174-8247205	Central Strait of Georgia
April-May 1982	2,517	1,019	3,536	2,793	0	743	DF8247206-8250761	Northern Strait of Georgia
June-July 1982	3,312	652	3,965	1,934	1,004	1,027	DF8250763-8254821	Southern and central??
July-Aug 1982	227	586	813		no injection		DF8258000-8258821	Dixon Entrance, Hecate Strait
Sept.-Oct. 1982	1,226	2,596	3,864		no injection		DF8258827-8262940	Hecate Strait
May 1983	991	622	1,613	812	0	801	DF8254822-8256389	Northern Strait of Georgia

Table 1 (cont'd)

Cruise	Numbers tagged M	F	T	OTC injections Intra-muscular	Intra-peritoneal	Control	Series numbers	Area
							Modified Peterson discs	
March 1984	1,533	1,733	3,277		no injection		DF8256390-8256399	Southern and central Strait of
							DF8256642-8257999	Georgia
							DF8262837-8262899	
							DF8262941-8264634	
May 1984	1,185	793	1,978		no injection		DF8307000-8308966	Southwest of Vancouver Island
							DF8309000-8309099	
May-June 1984	3,023	995	4,019	1,952	0	2,067	DF8264700-8266999	Northern Strait of Georgia
							DF8314000-8314666	
							DF8314700-8314762	
							DF8315000-8315999	
February 1985	76	981	1,057		no injection		DF8308967-8308999	Southwest of Vancouver Island
							DF8309100-8310083	
							DF8310143-8310152	
							DF8311100-8311974	
May 1985	2,924	1,188	4,113	2,027	0	2,086	DF8312000-8313999	Northern Strait of Georgia
							DF8314667-8314699	
							DF8314763-8314999	
							DF8316000-8316999	
July 1985	3,023	2,954	5,986		no injection		DF8310200-8311099	Southwest of Vancouver Island
							DF8332000-8337162	
Total	34,809	24,344	59,196	15,188	2,616			

Table 2. Set location and catch data for the VELMA C, and south and central Strait of Georgia, March 1984.

Set no.	Date	Area	Depth (m)	Time set (PST)	Soak time (min)	No. of hooks	No. of dogfish	No. of incidental catch
1	March 16	East of Porlier Pass	179	1620	55	498	88	10
2[a]	March 17	Active Pass	174	0850	100	~975	176	1
3[a]			177	1230	150	1025	244	1
4[a]	March 18	Active Pass	188	0740	225	1050	199	2
5[a]			178	1150	120	1050	168	4
6[a]			183	1540	105	~1025	79	14
7[a]	March 19	Active Pass	192	0715	105	1025	188	4
8	March 19		156	1105	110	~1000	142	7
9			192	1510	85	~1000	166	3
10	March 20	Active Pass	174	0700	90	~1000	139	17
11			174	1050	95	1106	86	11
12			196	1515	80	~1100	164	5
13	March 21	Active Pass	150	0700	110	~1100	106	17
14			220	1110	105	~1050	209	11
15	March 22	Halibut Bank	205	0615	90	~1050	155	5
16			178	1000	90	~1050	197	6
17	March 24	Malaspina Strait	170	0915	90	~1000	176	1
18			210	1515	90	~1000	227	3
19[a]	March 25	Malaspina Strait	271	0845	90	~1100	205	2
20[a]			250	1300	120	~1100	209	0
21[a]	March 26	Malaspina Strait	280	0645	110	1050	199	1
22			293	1020	130	~1050	188	1
23			298	1445	125	~1100	168	3
24	March 27	Malaspina Strait	183	1500	120	1005	146	0
25	March 28	Malaspina Strait	298	0635	90	~1005	185	0
26[a]			320	1010	110	~1000	209	1
27[a]			320	1400	120	~1000	249	0
28	March 29	Grant Reefs	202	0700	100	~1000	188	-
29			238	1030	90	~1000	190	2
30			265	1355	100	~1000	178	0
31[a]			233	0805	100	~1000	162	0
32[a]			325	1110	105	~1000	233	0
33			302	1445	95	~1000	214	1
34	March 31	Halibut Bank	220	0635	100	~1000	190	0
35			247	1000	130	~1000	199	0
Total						35,514	6,224	132

[a]Fish were not tagged from these sets.

Table 3. Set location and catch data for Campbell River area, May-June 1984.

Set no.	Date	Area	Depth (m)	Time set (PDT)	Soak time (min)	No. of hooks	No. of dogfish	No. of incidental catch
1	May 7	Cape Mudge	73	0830	80	308	128	1
2	May 7	Cape Mudge	79	1140	70	309	47	22
3	May 7	Cape Mudge	137	1400	60	303	102	8
4	May 8	Cape Mudge	82	0815	80	307	58	16
5	May 8	Cape Mudge	132	1045	65	306	106	4
6	May 8	Cape Mudge	146	1310	55	301	66	4
7	May 9	Deepwater Bay	82	1015	70	302	33	2
8	May 10	Cape Mudge	75	0815	65	308	58	20
9	May 14	Cape Mudge	88	0840	70	300	163	6
10	May 14	Cape Mudge	141	1125	70	303	120	13
11	May 14	Cape Mudge	157	1405	55	306	181	0
2	May 15	Marina Is.	20	0910	65	306	34	41
3	May 15	Marina Is.	59	1130	70	294	18	18
4	May 15	Francisco Pt.	128	1410	55	300	131	0
5	May 16	Cape Mudge	112	0825	70	300	148	3
6	May 16	Cape Mudge	137	1125	55	304	160	2
7	May 16	Cape Mudge	73	1405	70	309	38	15
8	May 23	Cape Mudge	86	0830	60	310	165	1
9	May 24	Cape Mudge	97	0815	60	302	150	2
20	May 24	Cape Mudge	128	1050	70	305	149	1
1	May 24	Cape Mudge	128	1320	75	305	144	6
2	May 28	Cape Mudge	94	0835	65	304	139	6
3	May 28	Cape Mudge	137	1120	70	306	151	5
4	May 28	Cape Mudge	128	1400	60	306	137	1
5	May 29	Cape Mudge	101	0830	65	300	167	0
6	May 29	Cape Mudge	130	1110	60	300	147	0
7	May 29	Cape Mudge	134	1340	50	300	112	7
8	May 31	Cape Mudge	22	0823	75	300	158	5
9	May 31	Cape Mudge	119	1130	60	300	175	0
30	June 1	Oyster Bay	27	0840	60	305	76	4
1	June 1	Oyster Bay	79	1050	75	302	74	6
2	June 1	Oyster Bay	92	1305	70	301	44	4
3	June 4	Cape Mudge	24	0815	60	308	180	24
4	June 4	Cape Mudge	115	1110	55	306	135	4
5	June 4	Cape Mudge	137	1340	65	296	75	15
36	June 5	Cape Mudge	27	0820	55	305	114	12
Total						10,927	4083	297

Table 4. Set location and catch data for the Campbell River area, May 1985.

Set no.	Date	Area	Depth (m)	Time set (PST)	Soak time (min)	No. of hooks	No. of dogfish	No. of incidental catch
1	May 2	Cape Mudge	82	0840	60	300	164	9
2	May 2	Cape Mudge	82	1210	65	300	198	2
3	May 6	Cape Mudge	90	0830	50	294	68	14
4	May 6	Cape Mudge	139	1055	60	300	57	25
5	May 6	Cape Mudge	135	1310	70	299	93	6
6	May 7	Cape Mudge	24	0830	60	305	4	45
7	May 7	Cape Mudge	128	1025	70	305	149	2
8	May 7	Cape Mudge	141	1310	65	304	68	8
9	May 8	Cape Mudge	91	0810	70	308	182	4
10	May 8	Cape Mudge	146	1055	70	304	146	4
1	May 9	Cape Mudge	91	0815	50	304	91	7
2	May 9	Cape Mudge	146	1105	55	294	185	0
3	May 9	Cape Mudge	146	1330	60	299	102	11
4	May 15	Cape Mudge	115	0830	45	305	186	0
5	May 15	Cape Mudge	154	1130	70	294	101	15
6	May 15	Cape Mudge	137	1400	75	310	189	4
7	May 16	Marina Is.	73	0900	60	309	104	5
8	May 16	Marina Is.	55	1125	70	300	86	11
9	May 16	Marina Is.	18	1345	60	298	71	81
20	May 17	Cape Mudge	132	0840	40	302	178	1
1	May 17	Cape Mudge	137	1145	60	295	76	7
2	May 21	Cortes Is.	22	0910	55	290	88	25
3	May 21	Marina Is.	22	1210	60	300	46	35
4	May 21	Marina Is.	18	1410	65	302	129	10
5	May 22	Cortes Is.	13	0905	75	304	74	68
6	May 22	Cortes Is.	64	1140	70	311	21	12
7	May 23	Cape Mudge	26	0820	55	304	86	43
9	May 23	Cape Mudge	126	1045	70	306	211	0
9	May 23	Cape Mudge	137	1350	55	285	124	8
30	May 24	Oyster Bay	137	0845	55	298	114	3
1	May 24	Oyster Bay	91	1110	65	306	92	0
2	May 24	Cape Mudge	146	1345	65	303	104	6
3	May 28	Cape Mudge	20	0830	70	300	123	1
4	May 28	Cape Mudge	145	1100	65	300	94	11
5	May 28	Cape Mudge	137	1320	65	300	85	2
6	May 29	Cape Mudge	123	0825	60	300	121	0
7	May 29	Cape Mudge	132	1050	60	300	102	9
38	May 29	Cape Mudge	141	1310	60	297	142	2
Total						11,435	4,254	496

Table 5. Number and tag identification of dogfish released in the Strait of Georgia by set by M/V VELMA C, March 1984.

Set no.	Release location	No. released M	F	T[a]	Tag no. range DF 82 ---	Cumulative release total
1	East of Porlier Pass	69	12	81	56390-56399 56642-56537	81
8	Active Pass	77	57	134	56538-56673	215
9	Active Pass	103	57	161	56674-56836	376
10	Active Pass	116	15	132	56838-56970	508
11	Active Pass	39	45	85	56971-57057	593
12	Active Pass	49	107	157	56058-57215	750
13	Active Pass	53	48	103	57216-57320	853
14	Active Pass	50	152	203	57321-57524	1056
15	Halibut Bank	80	65	145	57525-57671	1201
16	Halibut Bank	67	119	186	57672-57859 57860-57999	1387
17	Malaspina Strait	93	66	159	62837-62856 62857-62899	1546
18	Malaspina Strait	61	142	204	62941-63105	1750
22	Malaspina Strait	59	107	166	63106-63271	1916
23	Malaspina Strait	45	115	161	63272-63432	2077
24	Malaspina Strait	50	80	130	63433-63563	2207
25	Malaspina Strait	47	125	173	63564-63736	2380
28	Grant Reefs	115	64	180	63737-63916	2560
29	Grant Reefs	116	67	183	63917-64099	2743
30	Grant Reefs	90	78	168	64100-64268	2911
34	Halibut Bank	91	92	183	64269-64451	3094
35	Halibut Bank	63	119	183	64452-64634	3277
Total		1533	1733	3277		

[a]Total includes unsexed fish.

Table 6. Numbers and tag identification of dogfish released in the Campbell River area, May-June 1984.

Set no.	Release location	No. released M	F	T[a]	Tag range D 82 ---	No. injected[b]	Cumulative release total
1	Cape Mudge	79	48	127	64700-64756 64800-64869	70	127
2	Cape Mudge	34	13	47	64757-64781 64870-64891	22	174
3	Cape Mudge	61	38	100	64782-64799 64892-64945 65000-65027	54	274
4	Cape Mudge	28	30	58	64946-64975 65028-65059	30	332
5	Cape Mudge	89	14	103	64976-64999 65054-65127 65200-65206	51	435
6	Cape Mudge	55	11	66	65128-65163 65207-65236	30	501
7	Deepwater Bay	23	10	33	65164-65183 65237-65259	13	534
8	Cape Mudge	20	37	57	65184-65199 65250-65276 65300-65313	27	591
9	Cape Mudge	150	12	162	65277-65299 65314-65453	77	753
10	Cape Mudge	55	60	115	65454-65558 65600-65610	58	868
11	Cape Mudge	138	41	179	65559-65599 65611-65744 65800-65804	89	1047
12	Marina Is.	2	32	34	65745-65761 65805-65821	17	1081
13	Marina Is.	1	17	18	65762-65770 65822-65830	9	1099
14	Francisco Pt.	77	53	130	65771-65799 65831-65931	61	1229
15	Cape Mudge	120	23	143	65932-65991 66000-66082	49	1372
16	Cape Mudge	135	22	157	65992-65999 66083-66163 66200-66270	67	1529
17	Cape Mudge	20	17	37	66164-66183 66271-66287	20	1566
18	Cape Mudge	154	11	165	66184-66199 66288-66370 66400-66465	82	1734
19	Cape Mudge	116	34	150	66371-66399 66466-66548	72	1881

Table 6 (cont'd)

Set no.	Release location	No. released M	No. released F	No. released T[a]	Tag range D 82 ---	No. injected[b]	Cumulative release total
20	Cape Mudge	119	27	146	66549-66599 66637-66726 66800-66805	68	2027
21	Cape Mudge	128	14	142	66727-66799 66806-66874	69	2169
22	Cape Mudge	96	41	137	66875-66966 DF83 15000-15044	66	2306
23	Cape Mudge	99	50	149	DF82 66967-66999 DF83 15045-15151 15200-15216	78	2455
24	Cape Mudge	116	19	135	15146-15199 15217-15282 15300-15314	70	2590
25	Cape Mudge	139	25	164	15283-15299 15315-15389 15400-15472	74	2754
26	Cape Mudge	121	25	146	15390-15399 15473-15560 15700-15747	71	2900
27	Cape Mudge	86	23	109	15561-15617 15748-15799	57	3009
28	Cape Mudge	113	44	157	15618-15675 15800-15898	56	3166
29	Cape Mudge	138	30	168	14000-14051 15676-15699 15899-15990	74	3334
30	Oyster Bay	49	23	72	14052-14087 14200-14226 15991-15999	36	3406
31	Oyster Bay	38	35	73	14088-14122 14227-14264	38	3479
32	Oyster Bay	18	26	44	14123-14143 14265-14287	23	3523
33	Cape Mudge	159	19	178	14144-14199 14288-14393 14400-14415	106	3701
34	Cape Mudge	114	15	129	14394-14399 14416-14474 14500-14564	70	3830

Table 6 (cont'd)

Set no.	Release location	No. released M	F	T[a]	Tag range D 82 ---	No. injected[b]	Cumulative release total
35	Cape Mudge	44	31	75	14475-14499 14565-14605 14700-14709	45	3905
36	Cape Mudge	81	33	114	14606-14666 14710-14762	53	4019
Total		3023	995	4019		1952	

[a]Total includes unsexed fish.
[b]Intermuscular OTC injection.

Table 7. Numbers and tag identification of dogfish released in the Campbell River area, May 1985.

Set no.	Release location	No. released M	F	T	Tag range D 83 ---	No. injected[a]	Cumulative release total
1	Cape Mudge	126	36	162	14667-14699 14763-14848 14900-14942	77	162
2	Cape Mudge	174	23	197	14849-14899 14943-14999 16000-16058 16100-16131	110	359
3	Cape Mudge	41	26	67	16059-16087 16132-16169	35	426
4	Cape Mudge	34	23	57	16088-16099 16170-16214	30	483
5	Cape Mudge	68	25	93	16215-16254 16300-16352	44	576
6	Cape Mudge	0	4	4	16255-16256 16353-16354	2	580
7	Cape Mudge	133	13	146	16257-16299 16355-16452 16500-16505	51	726
8	Cape Mudge	38	29	67	16453-16495 16506-16529	24	793
9	Cape Mudge	168	12	180	16496-16499 16530-16705 16800-16801	105	973
10	Cape Mudge	115	28	143	16707-16775 16802-16874	74	1116
11	Cape Mudge	65	25	90	16776-16799 16875-16920 13000-13019	46	1206
12	Cape Mudge	158	23	181	16921-16999 13020-13115 13200-13206	86	1387
13	Cape Mudge	77	23	100	13116-13173 13207-13246	42	1487
14	Cape Mudge	162	24	186	13174-13199 13249-13299 13500-13524 13900-13985	76	1673
15	Cape Mudge	87	13	100	13525-13569 13600-13640 13986-13999	45	1773
16	Cape Mudge	160	21	181	13300-13368 13570-13599 13641-13722	99	1954

Table 7 (cont'd)

Set no.	Release location	No. released M	F	T	Tag range D 83 ---	No. injected[a]	Cumulative release total
17	Marina Is.	30	70	100	13369-13420 13723-13770	48	2054
18	Marina Is.	21	63	84	13421-13469 13770-13805	35	2138
19	Marina Is.	4	66	70	13470-13499 13806-13835 12000-12009	30	2208
20	Cape Mudge	155	22	177	13836-13899 12010-12122	86	2385
21	Cape Mudge	66	8	74	12123-12156 12200-12239	34	2459
22	Cortes Is.	8	79	87	12157-12199 12240-12284	42	2546
23	Marina Is.	1	45	46	12285-12323 12400-12406	24	2592
24	Marina Is.	21	100	121	12324-12389 12407-12462	66	2713
25	Cortes Is.	61	11	72	12390-12399 12463-12521 12600-12602	39	2785
26	Marina Is.	7	13	20	12522-12527 12603-12616	14	2805
27	Cape Mudge	17	69	86	12528-12567 12617-12662	46	2891
28	Cape Mudge	182	21	204	12568-12599 12663-12771 12800-12863	108	3095
29	Cape Mudge	102	19	121	12772-12799 12864-12932 11100-11123	62	3216
30	Oyster Bay	84	19	103	12933-12981 11124-11178	48	3319
31	Oyster Bay	56	28	84	12982-12999 11179-11222 11300-11321	40	3403
32	Cape Mudge	58	37	95	11223-11271 11322-11367	46	3498
33	Cape Mudge	94	26	120	11272-11299 11368-11433 11500-11525	54	3618
34	Cape Mudge	61	26	87	11434-11477 11526-11568	44	3705
35	Cape Mudge	50	28	78	11478-11499 11569-11615 11700-11708	40	3783

Table 7 (cont'd)

Set no.	Release location	No. released M	F	T	Tag range D 83 ---	No. injected[a]	Cumulative release total
36	Cape Mudge	82	28	110	11616-11669 11709-11766	54	3893
37	Cape Mudge	71	23	94	11670-11699 11767-11816 11900-11915	46	3987
38	Cape Mudge	85	41	126	11817-11883 11916-11974	79	4113
Total		2924	1188	4113		2027	

[a]intermuscular OTC injection

Table 8. Numbers and tag identification of dogfish released off the southwest coast of Vancouver Island, May 1984.

Set no.	Release location	No. released M	F	T	Tag no. range DF 83 ----	Cumulative release total
1	48°41.2 125°13.1	28	52	80	07000-07042 09100-07137	80
3	48°41.9 125°12.8	152	181	333	07043-07427 07138-07427	413
4	48°41.7 125°13.2	34	37	71	07428-07455 07500-07542	484
5	48°40.8 125°12.3	2	8	10	07456-07465	494
6	48°41.7 125°13.6	24	10	34	07466-07499	528
7	48°40.1 125°12.9	76	46	122	07543-07671	650
8	48°42.8 125°13.8	22	11	33	07642-07704	683
9	48°40.6 125°14.1	20	15	25	07705-07740	718
10	48°39.9 125°12.7	10	9	19	07741-07759	737
11	48°55.5 125°41.7	0 0	2 2	2 2	07760-07761 07760-07761	739 739
12	48°53.3 126°08.1	0	4	4	07762-07765	743
13	48°52.2 126°05.5	67	19	86	07766-07843 07900-07909	829
14	48°52.4 126°10.6	18	16	34	07844-07877	1863
15	48°51.5 126°10.2	237	81	318	07878-07899 07910-08259	1181
16	48°51.6 126°07.2	40	19	59	08260-08289 08300-08329	1240
17	48°52.0 126°09.1	19	9	28	08290-08296 08330-08350	1268
18	48°52.1 126°09.4	20	14	34	08351-08366 08400-08417	1302
19	48°52.1 126°09.4	28	22	50	08367-08389 08418-08444	1352
20	48°50.6 126°08.2	7	23	30	08390-08399 08445-08464	1382
22	48°26.6 125°14.3	5	1	6	08465-08470	1388
24	48°26.7 1125°33.3	7	13	20	08471-08490	1408
25	48°29.9 125°36.1	6	40	46	08491-08518 08600-08617	1454

Table 8 (cont'd)

Set no.	Release location	No. released M	F	T	Tag no. range DF 83 ----	Cumulative release total
26	48°33.5 125°40.9	2	4	6	08618-08623	1460
27	48°33.5 125°40.9	0	3	3	08624-08626	1463
28	48°36.8 125°57.9	88	26	114	08519-08569 08627-08689	1577
29	48°36.8 125°57.9	71	26	97	08570-08599 08690-08744 08800-08814	1674
30	48°39.0 125°57.7	99	10	109	08745-08799 08815-08870	1783
31	48°38.8 125°59.3	7	6	13	08871-08883	1796
32	48°42.2 125°56.6	17	11	28	08884-08899 09000-09011	1824
33	48°40.9 125°55.5	53	29	82	08900-08939 09012-09053	1906
34	48°42.4 125°58.4	2	15	17	09054-09070	1923
35	48°42.4 125°58.4	22	14	36	08940-08947 09071-09099	1959
36	48°48.7 126°04.0	1	7	8	08948-08955	1967
37	48°48.7 126°04.0	-	1	1	08956-	1968
38	48°49.7 126°33.6	1	3	4	08957-08960	1972
39	48°48.4 126°33.5	-	6	6	08961-08966	1978
Total		1185	793	1978		

Table 9. Numbers and tag identification of dogfish released off the southwest coast of Vancouver Island, February 1985.

Set no.	Release location	No. released M	F	T	Tag no. range DF 83 ----	Cumulative release total
1	48°29.6 125°28.5	32	5	37	08967-09103	37
2	48°26.3 125°37.5	41	2	43	09104-09146	80
3	48°33.8 125°44.0	2	3	5	09147-09151	85
4	48°40.5 125°55.0	1	23	24	09152-09175	109
5	48°41.4 125°57.2	0	25	25	09176-09200	134
6	48°41.4 125°57.2 48°37.0 126°04.0	0	183	183	09201-09383	317
7	48°40.1 125°12.1	0	26	26	09384-09409	343
8	48°41.8 125°14.8	0	50	50	09410-09460	393
9	48°41.3 125°12.6	0	57	57	09461-09517	450
10	48°41.3 125°12.6	0	80	80	09518-09559 09600-09637	530
11	48°40.3 125°12.7	0	111	111	09560-09599 09638-09686 09700-09722	641
12	48°40.4 125°12.7	0	125	125	09687-09699 09723-09785 09800-09851	766
13	48°30.8 126°04.9	0	143	143	09786-09799 09852-09899 09900-09942 10000-10041	909
14	48°40.6 125°58.0	0	3	3	09943-09954	912
15	48°43.9 125°59.7	0	1	1	09946	913
16	48°43.1 126°02.4	0	2	2	09947-09948	915
17	48°43.1 126°02.4	0	1	1	09949	916
18	48°40.2 125°12.8	0	27	27	09951-09980	943

Table 10. Numbers and tag identification of dogfish released off the southwest coast of Vancouver Island, July 1985.

Set no.	Release location	No. released M	F	T[a]	Tag no. range DF 83 ----	Cumulative release total
1	48°40.7 125°12.2	126	141	268[a]	10200-10471	268
2	48°39.2 125°11.3	195	212	407	10472-10499 10500-10859 10900-10947	675
3	48°41.3 125°13.3	411	399	812	10860-10899 10948-11099 32000-32559 32600-32659	1487
4	48°41.1 125°12.0	351	421	773	32560-32599 32658-33341 33400-33456	2260
5	48°41.5 125°12.9	280	145	425	33342-33399 33457-33763 33800-33864	2685
6	48°41.0 125°11.8	58	66	124	33764-33799 33866-33932 34000-34022	2809
7	48°41.4 125°13.5	37	8	45	33934-33959 34023-34041	2854
8	48°41.6 125°13.4	124	13	137	33960-33999 34042-34138	2991
9	48°41.7 125°13.1	20	31	51	34139-34189	3042
10	48°41.0 125°12.2	62	27	90	34190-34279	3132
11	48°39.9 125°11.1	171	57	228	34280-34470 34500-34537	3360
12	48°58.8 126°16.6	98	49	147	34471-34499 34538-34659	3507
13	48°51.4 126°10.3	2	1	3	34660-34662	3510
14	48°56.3 125°43.8	272	358	630	34663-35295	4140
15	48°56.3 125°43.8	252	377	630	35296-35889 35900-35946	4770
16	48°44.7 125°42.5	22	40	62	35890-35899 35947-35978 36000-36019	4832
17	48°56.2 125°45.5	24	37	61	36020-36082	4893
18	48°56.1 125°39.7	6	10	16	35979-35996	4909

Table 10 (cont'd)

Set no.	Release location	No. released M	F	T[a]	Tag no. range DF 83 ----	Cumulative release total
19	48°42.4 125°13.7	21	48	69	35997-35999 36083-36131 36200-36216	4978
20	48°42.4 125°13.7	1	13	14	36132-36145	4992
21	48°40.1 125°11.5	22	45	67	36146-36199 36217-36229	5059
22	48°40.2 125°11.6	17	27	44	36230-36273	5103
23	48°38.8 125°10.2	17	20	37	36274-36310	5140
24	48°56.5 125°41.7	14	11	26	36311-36336	5166
25	48°56.1 125°40.3	19	33	52	36337-36389	5218
26	48°56.1 125°43.1	25	13	38	36390-36430	5256
27	48°56.1 125°43.1	40	42	82	36431-36512	5338
28	48°56.2 125°42.5	7	12	19	36513-36531	5337
29	48°54.3 125°39.3	73	123	196	36532-36727	5553
30	48°54.5 125°39.2	30	55	85	36728-36782 36800-36829	5638
31	48°33.7 124°43.3	47	20	67	36783-36799 36830-36881	5705
32	48°33.1 124°41.2	76	29	105	36882-36952 37000-37033	5810
33	48°33.7 124°44.2	103	73	176	36953-36999 37034-37162	5986
Total		3023	2956	5986		

[a]Total includes unsexed fish.

Table 11. Incidental longline catch by set during dogfish tagging aboard VELMA C, March 1984.

	Set no.																																	
Species	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	Total
Yelloweye rockfish										6				1		5	1	2																		15
Sablefish			1		1	1	1	2	1		5	4	2	2					1			1	1			1			1				1			26
Pacific cod		1		1										1																						3
Pollock													1	1																						2
Brown cat shark							1							1																						2
Ratfish	10			1	2	12		5	1	2	4		12	4	5	1					1		1						1							61
Skate					1	1	2		1	9	2	1	2	1																						21
Six gill shark																		1						1												2
Total	10	1	1	2	4	14	4	7	3	17	11	5	17	11	5	6	1	3	1	0	1	1	3	0	0	1	0	0	2	0	0	0	1	0	0	132

Table 12. Incidental longline catch by set during dogfish tagging in the Campbell River area, May-June 1984.

| Species | Set no. | | |

Table 13. Incidental longline catch by set during dogfish tagging in the Campbell River area, May 1985.

| Species | Set no. | | |

Table 14. List of common and scientific names of fishes captured during dogfish tagging cruises conducted in 1984 and 1985.

Common names	Scientific names
FLATFISH	
Arrowtooth flounder (turbot)	*Atheresthes stomias*
Curlfin sole	*Pleuronichthys decurrens*
Dover sole	*Microstomus pacificus*
English sole	*Parophrys vetulus*
Flathead sole	*Hippoglossoides elassodon*
Pacific halibut	*Hippoglossus stenolepis*
Pacific sanddab	*Ctharichthys sordidus*
Petrale sole	*Eopsetta jordani*
Rex sole	*Glyptocephalus zachirus*
Rock sole	*Lepidopsetta bilineata*
Slender sole	*Lyopsetta exilus*
ROUNDFISH	
Eelpouts/Poachers	Zoarcidae
Eulachon	*Thaleichthys pacificus*
Greenlings	Hexagrammidae
Midshipman	*Porichthys notatus*
Pacific hake	*Merluccius productus*
Pacific herring	*Clupea harengus pallasi*
Lingcod	*Ophiodon elongatus*
Pacific cod	*Gadus macrocephalus*
Pacific tomcod	*Microgadus proximus*
Sablefish/Blackcod	*Anoplopoma fimbria*
Salmon	Oncorhynchus
Shad	*Alosa sapidissima*
Shiner perch	*Cymatogaster aggregata*
Smelts	Osmeridae
Walleye pollock	*Theragra chalcogramma*
Wolfeel	*Anarrhichthys*
SELACHII	
Ratfish	*Hydrolagus colliei*
Skates	Rajidae
Brown catshark	*Apristurus brunneus*
Sixgill shark	*Hexanchus griseus*
Spiny dogfish	*Squalus acanthias*
ROCKFISH	
Canary rockfish	*Sebastes pinniger*
Copper rockfish	*S. caurinus*
Dark-blotched rockfish	*S. crameri*
Quillback rockfish	*S. maliger*
Yelloweye rockfish	*S. ruberrimus*
Yellowtail rockfish	*S. flavidus*

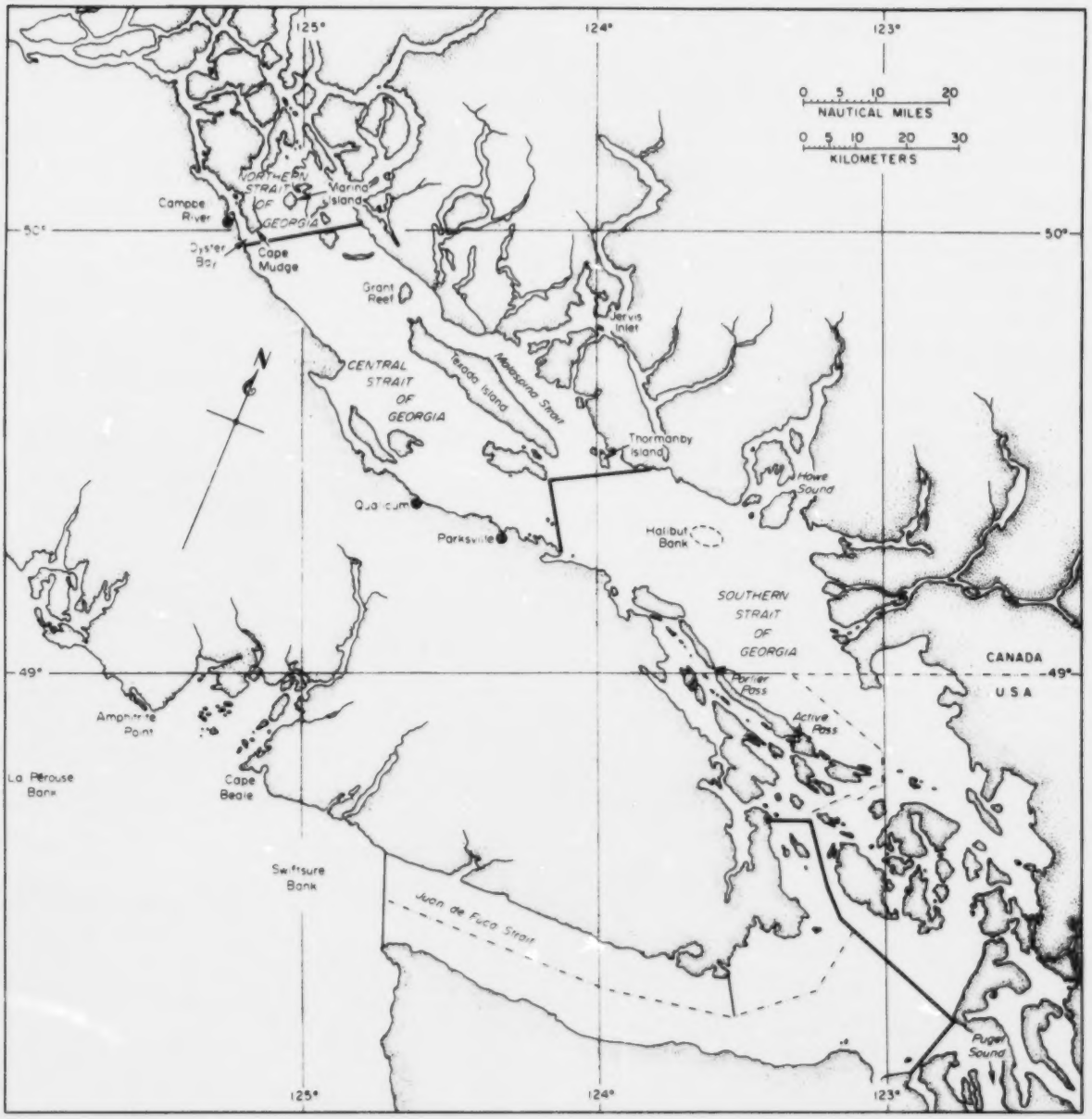

Fig. 1. Location of reference points of dogfish tag releases in Strait of Georgia and off southwest Vancouver Island during 1984 and 1985.

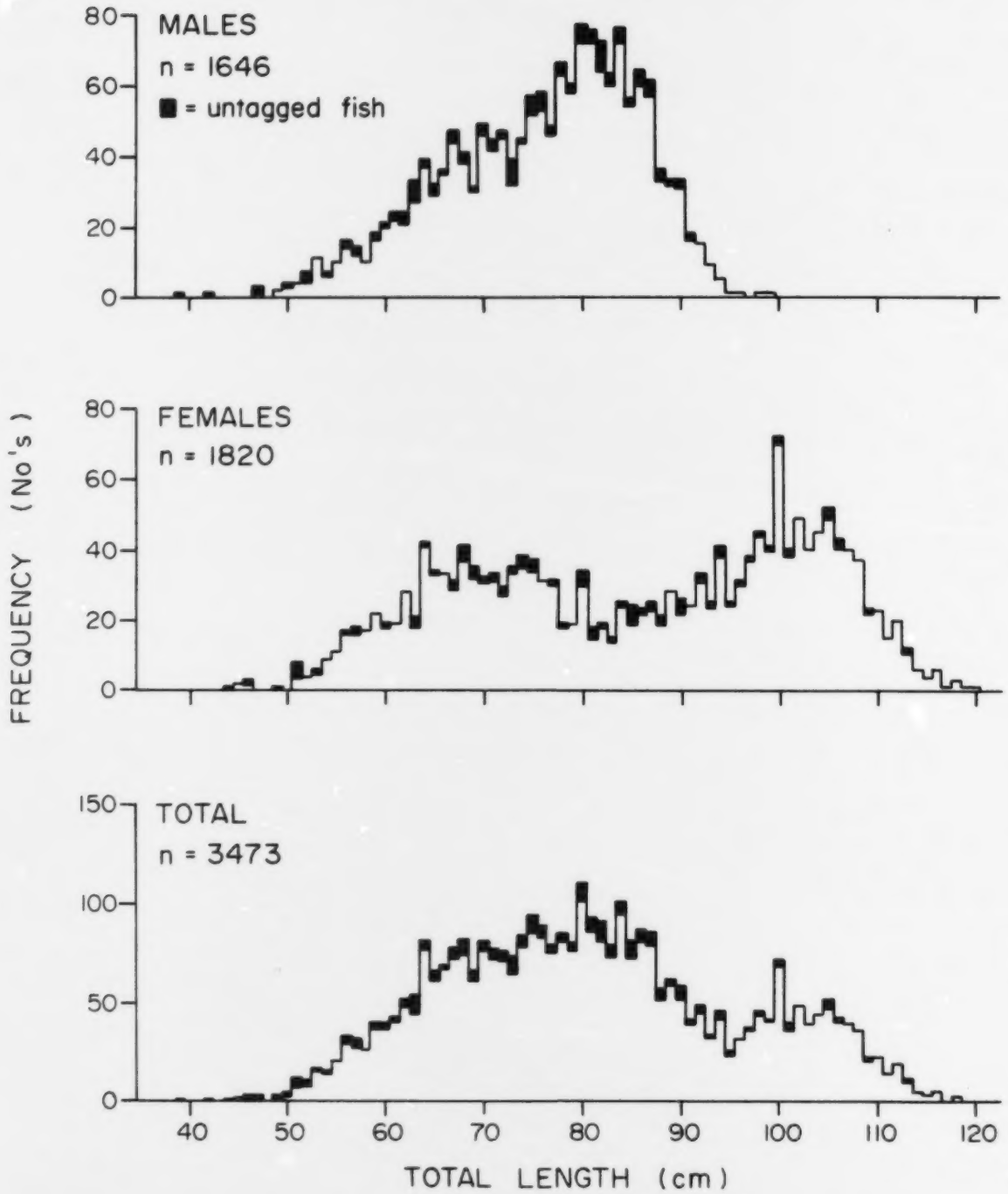

Fig. 2. Length frequency of dogfish captured in the south and central Strait of Georgia during March 1984.

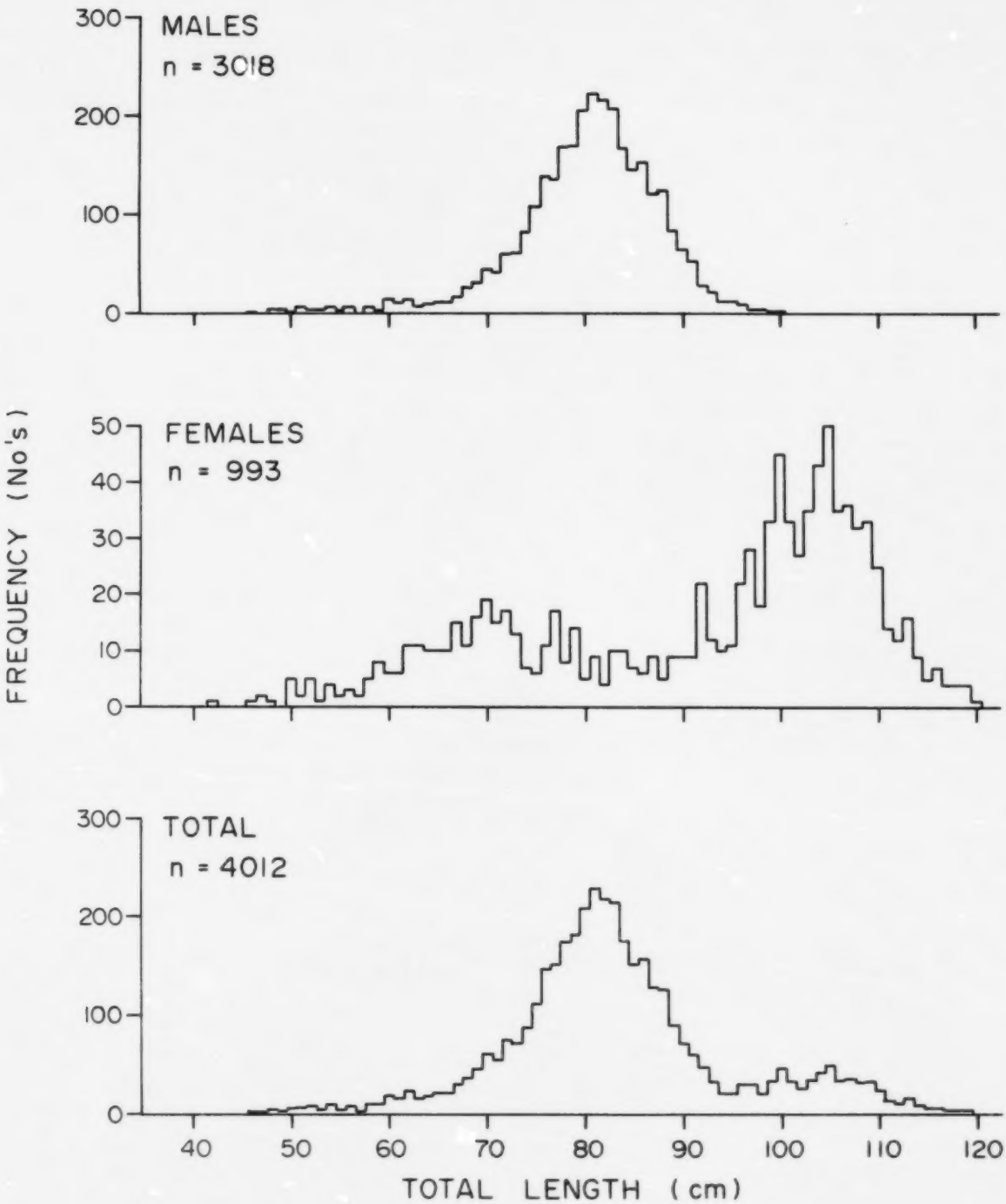

Fig. 3. Length frequency of dogfish captured in the Campbell River area during May 1984.

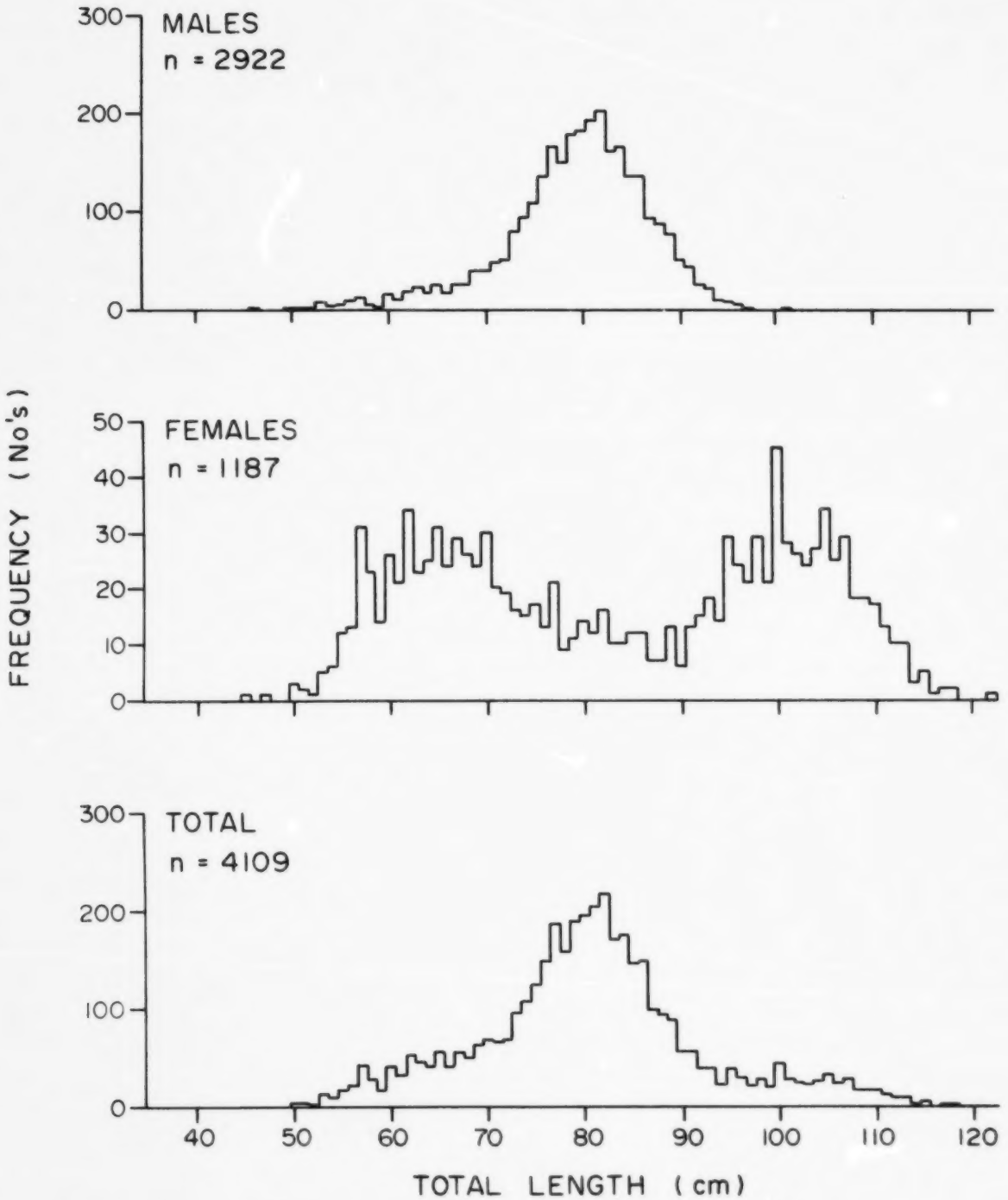

Fig. 4. Length frequency of dogfish captured in the Campbell River area during May-June 1985.

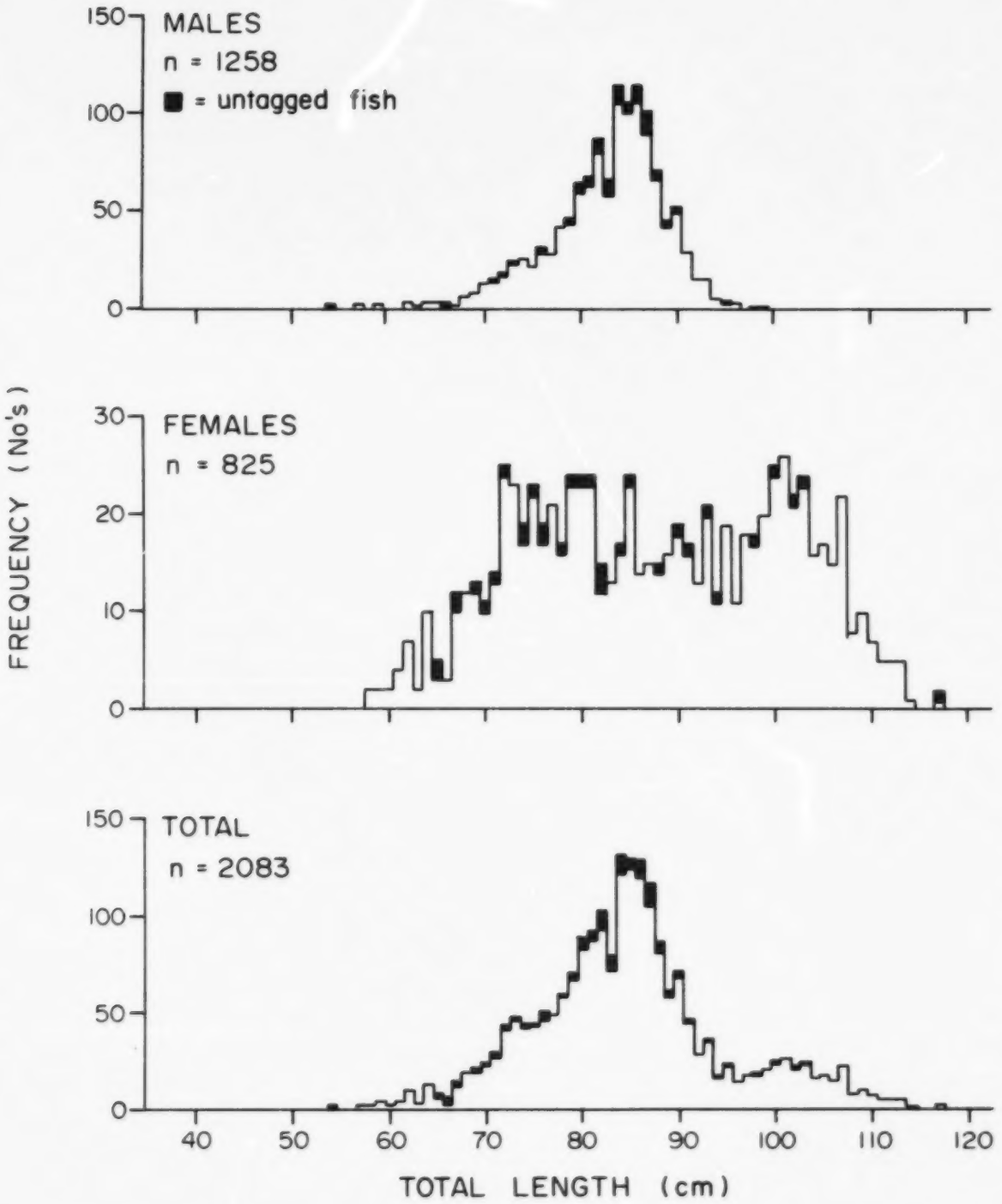

Fig. 5. Length frequency of dogfish captured off southwest Vancouver Island during May 1984.

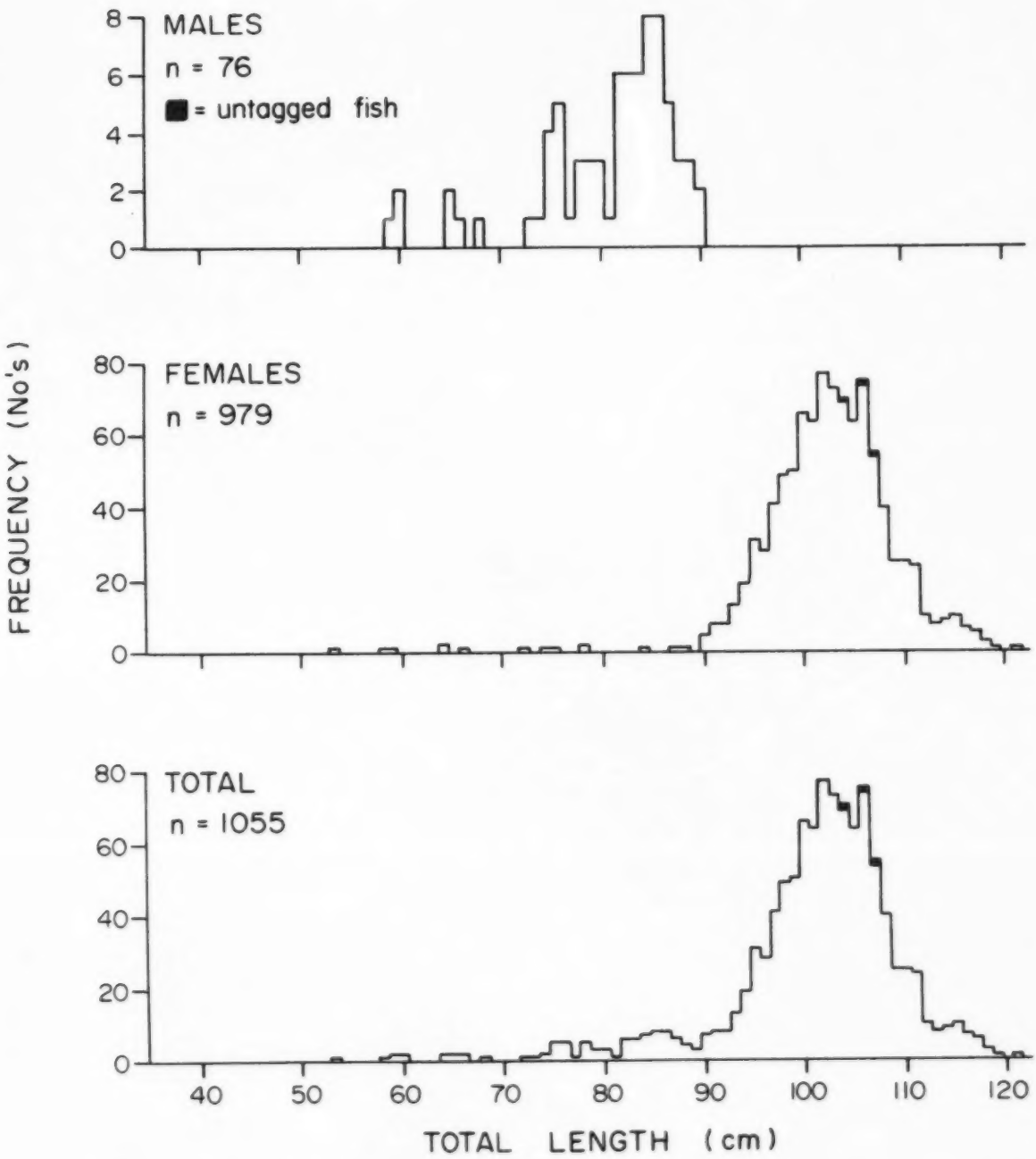

Fig. 6. Length frequency of dogfish captured off southwest Vancouver Island during February-March 1985.

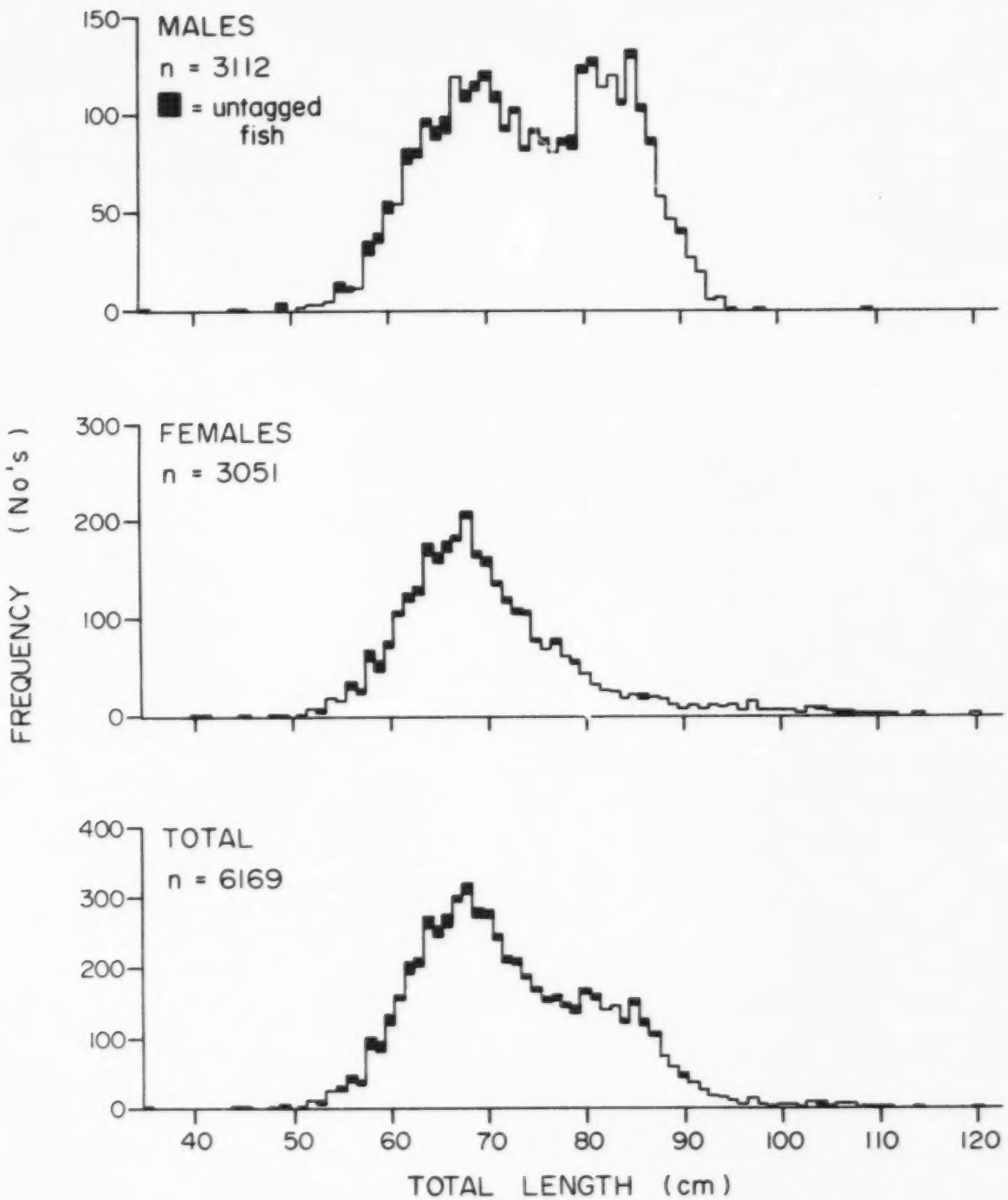

Fig. 7. Length frequency of dogfish captured off southwest Vancouver Island during July 1985.

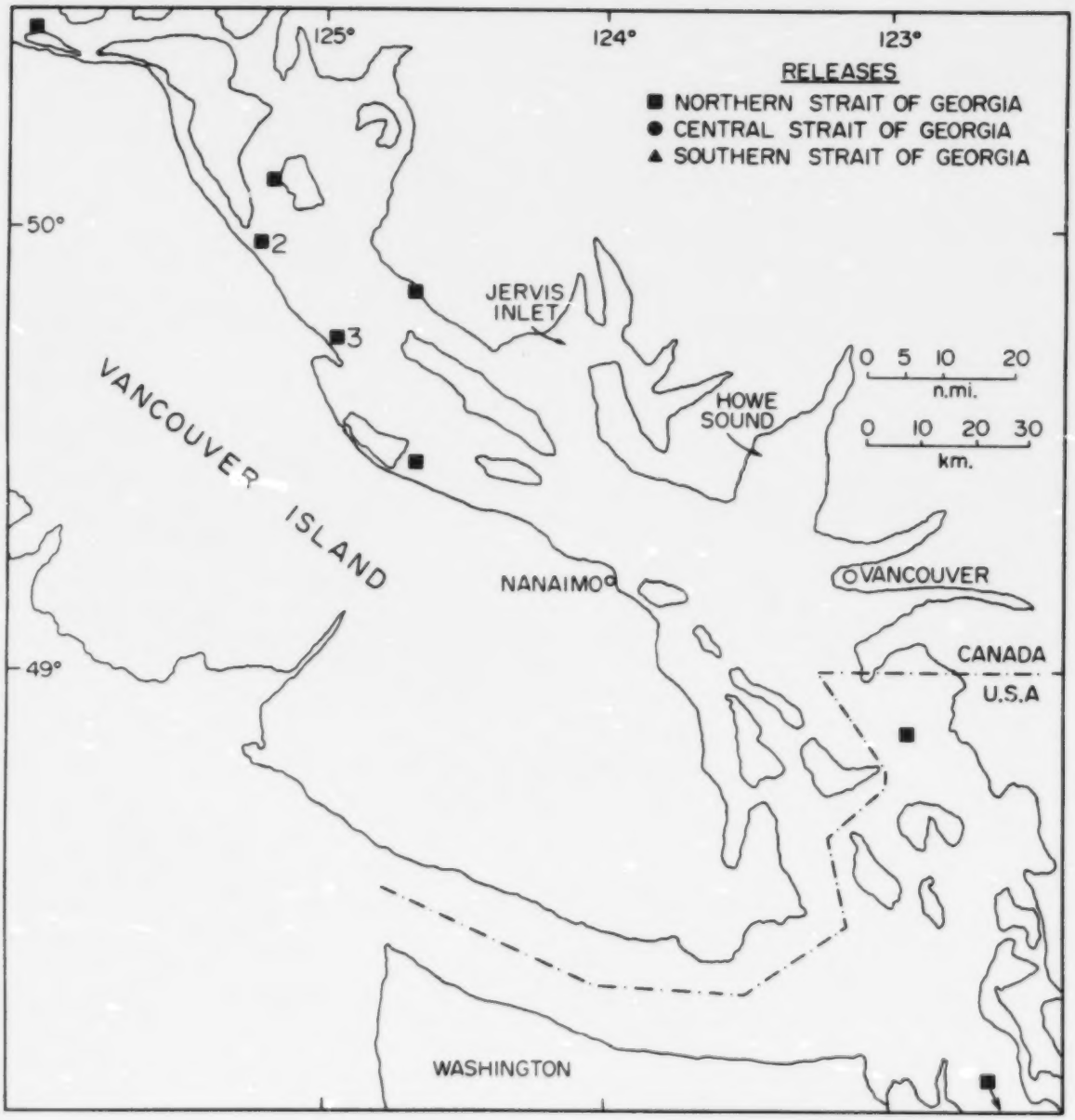

Fig. 8. Tag recovery locations during 1985 from releases in the Campbell River area during 1985.

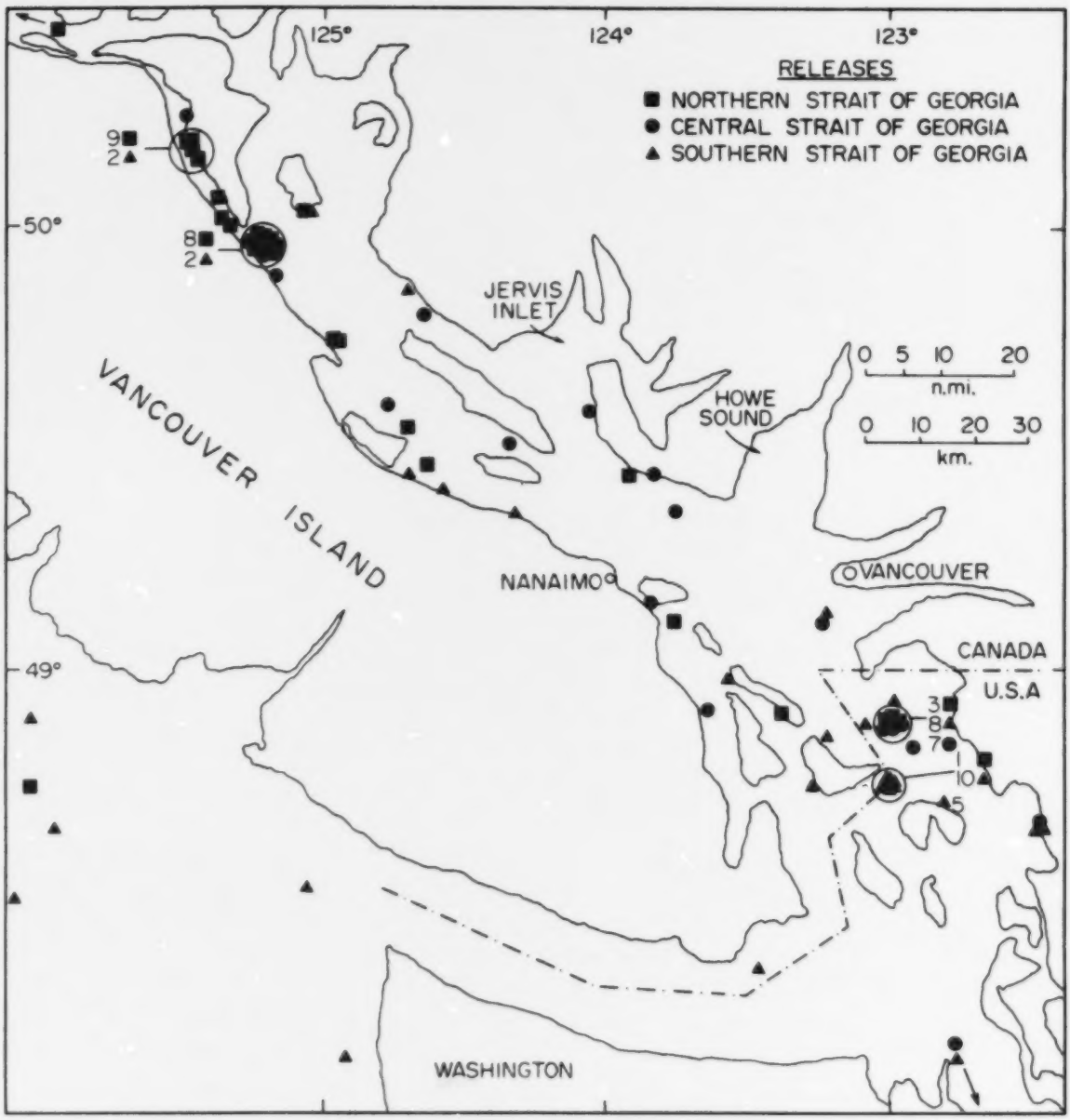

Fig. 9. Tag recovery locations during 1984 and 1985 releases in the southern central and northern Strait of Georgia during 1984.

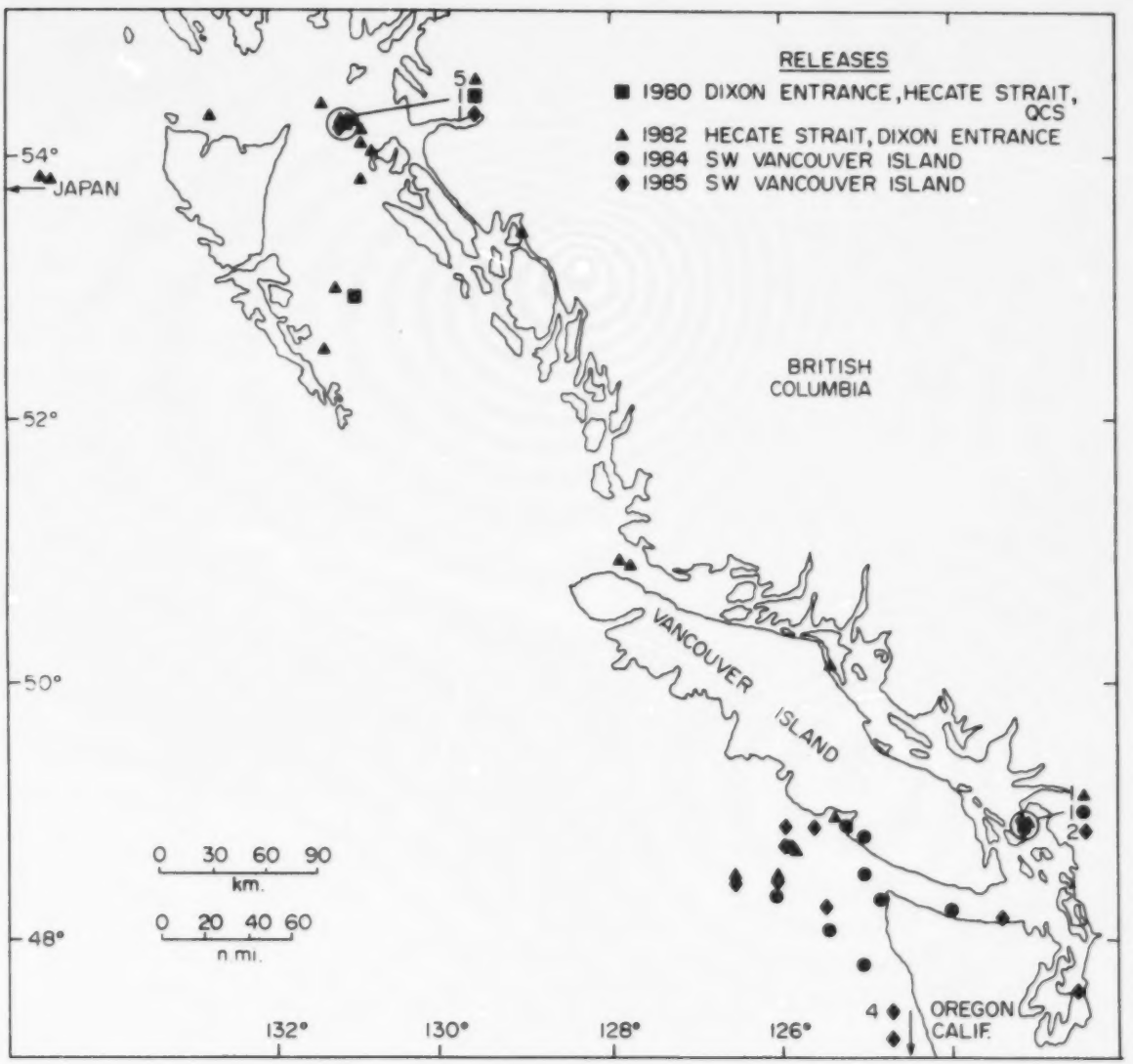

Fig. 10. Tag recovery locations during 1984 and 1985 from offshore releases 1980-1985.

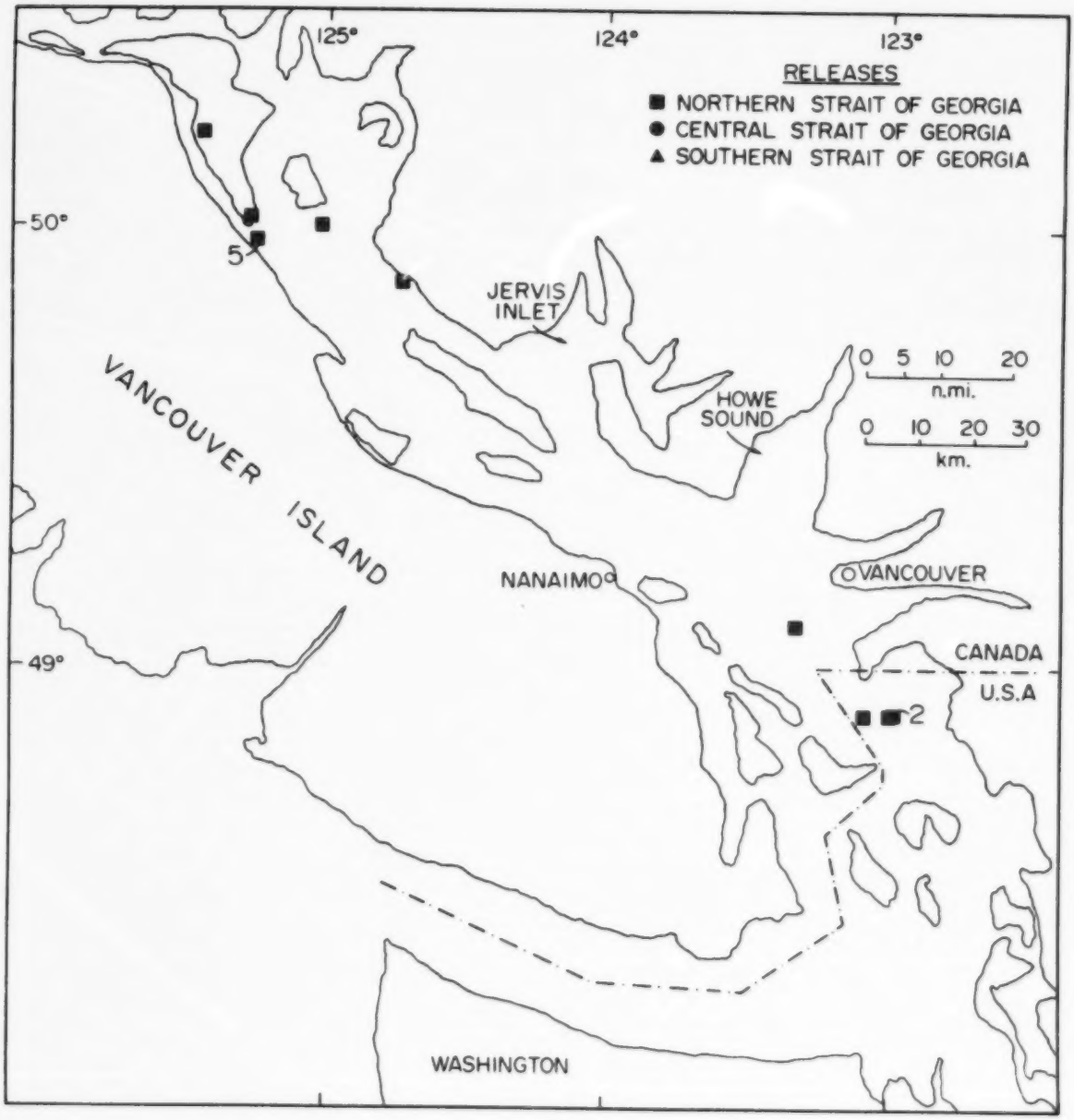

Fig. 11. Tag recovery locations during 1984 and 1985 from releases in the Campbell River area during May 1983.

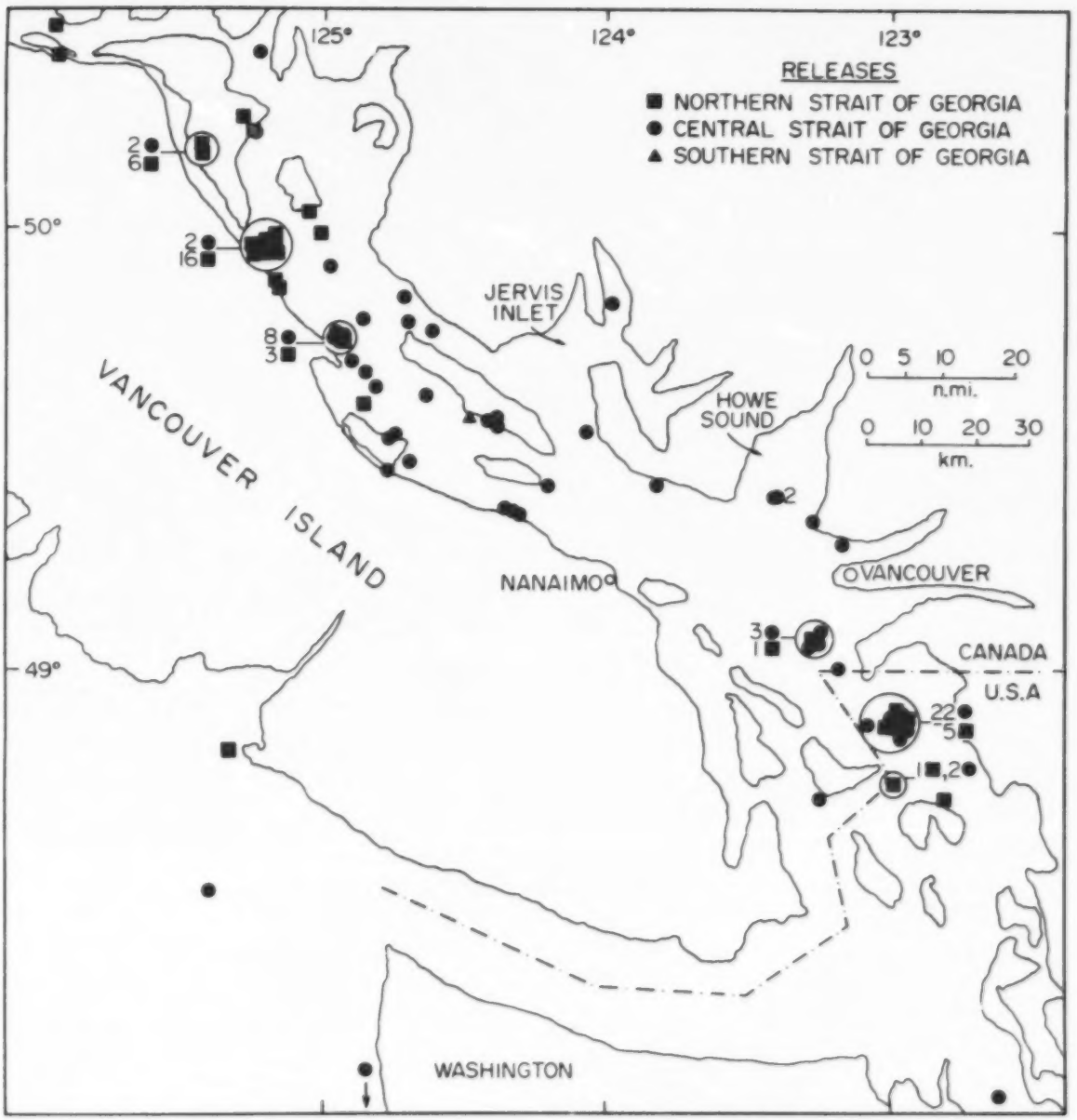

Fig. 12. Tag recovery location during 1984 and 1985 from releases in southern, central and northern Strait of Georgia during 1982.

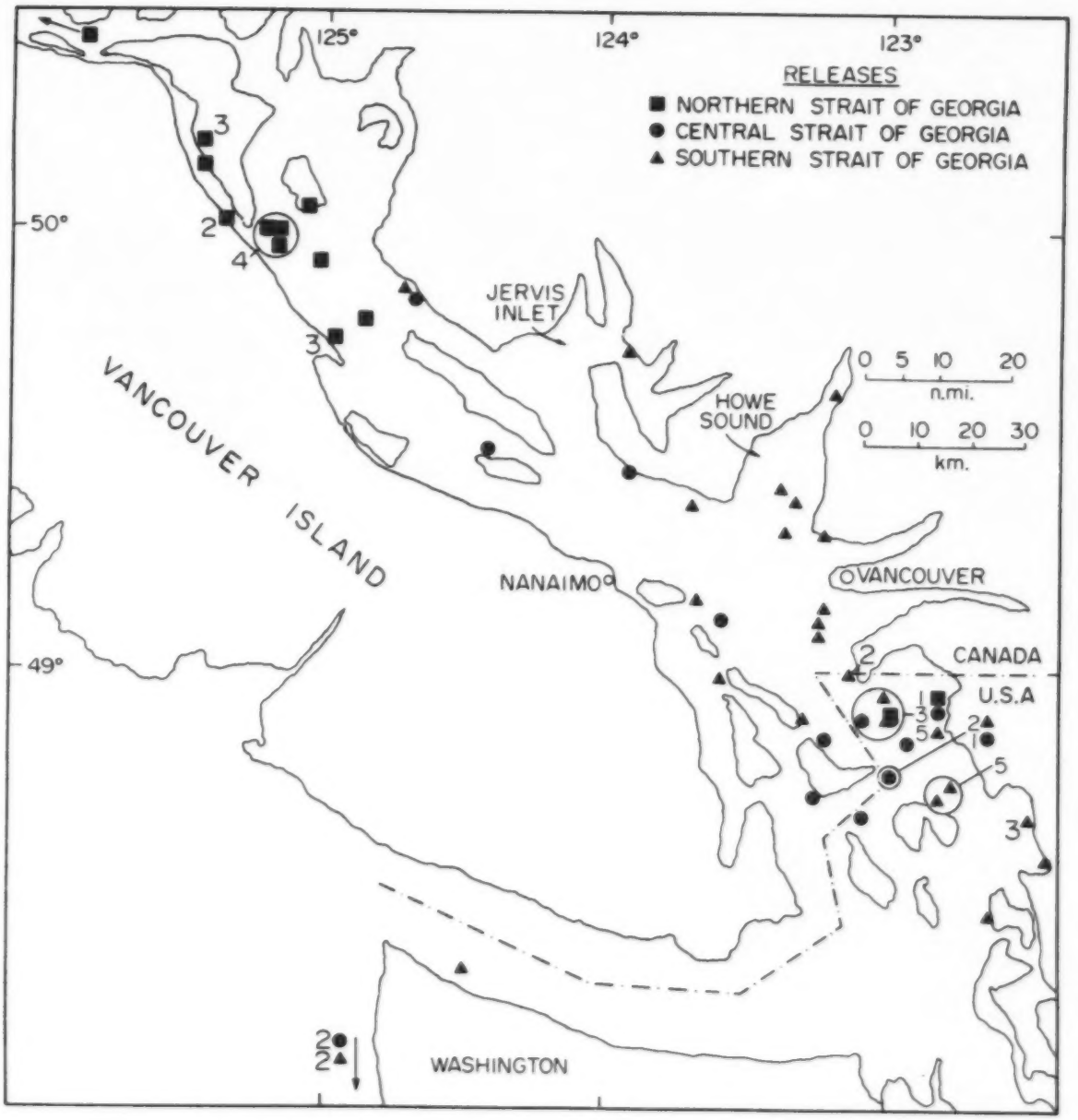

Fig. 13. Tag recovery locations during 1984 and 1985 from releases in south, central, and north Strait of Georgia during 1981.

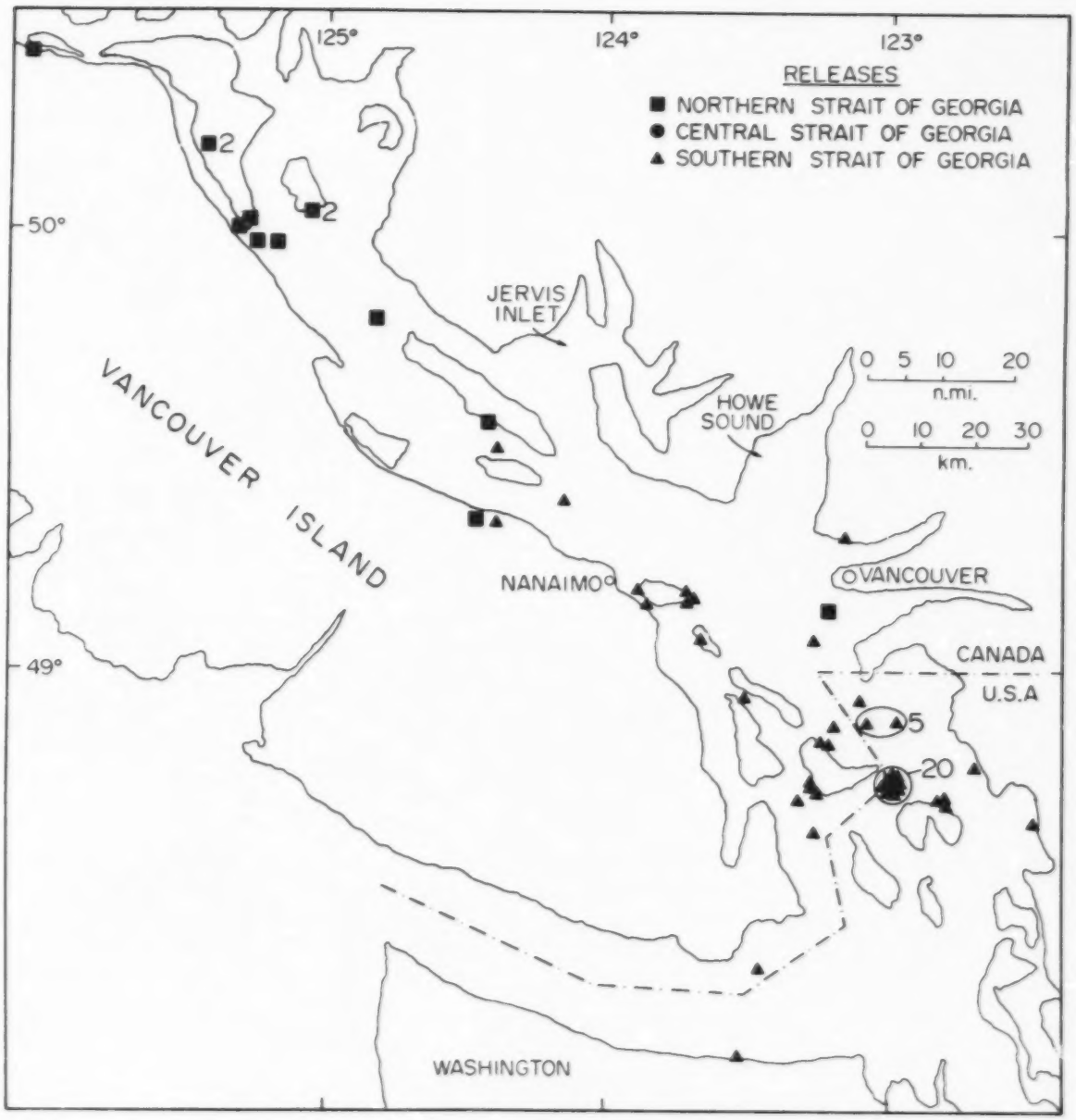

Fig. 14. Tag recovery locations during 1984 and 1985 from releases in the south and north Strait of Georgia during 1980.

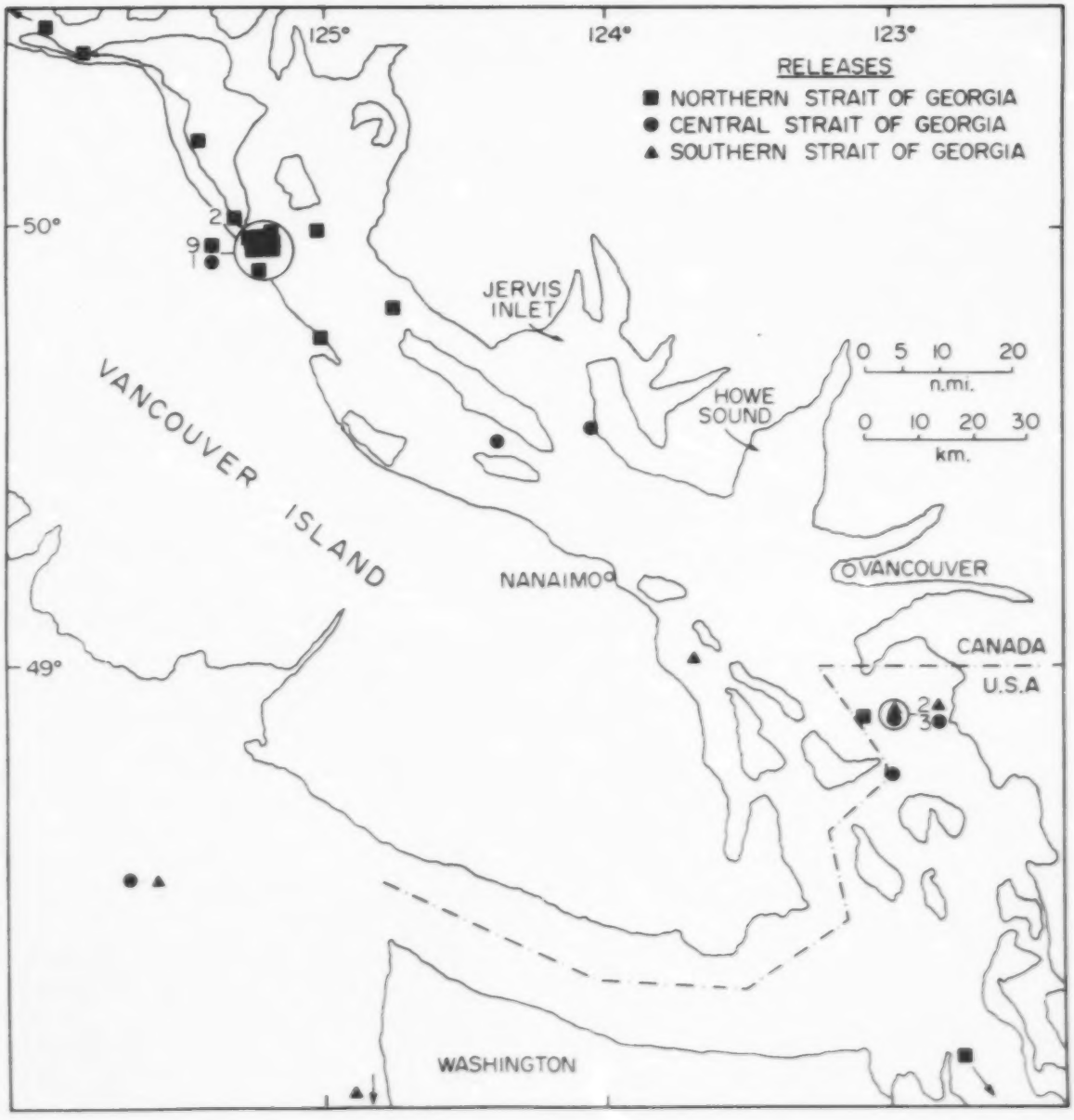

Fig. 15. Tag recovery locations during 1984 and 1985 from releases in the south, central and north Strait of Georgia during 1979.